

amateur radio



VOL. 45, No. 6

JUNE 1977

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COVER PHOTO

Michael Owen VK3KI (right) presents Peter Williams VK3IZ (left) with an engraved plaque in recognition of Peter's role in the formation and establishment of the International Amateur Radio Union — Region 3. (See IARU News on page 18.)

The presentation was made at the 1977 Federal Convention held in Melbourne over the Anzac Day weekend.

— Photo by Cyril Maude, VK3ZCK.

HAM

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\$29.90 Postage \$2.20

MODEL CT-500/P MULTIMETER

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SPECIFICATION: 20,000 ohm/volt DC; 10,000 ohm/volt AC. **DC Volts:** 2.5, 10, 50, 250, 500, 5000. **AC Volts:** 10, 50, 250, 500, 1,000. **DC Amps:** 0.05 mA, 0.5 mA, 5 mA, 50 mA. **DC Ohms:** 100 ohm, 1,000 ohm, 10K ohm, 100K ohm. **Centre Scale:** 60 ohm, 600 ohm, 6K ohm, 60K ohm. **Decibel:** -20 to +62 dB. **Dimensions:** 5-3/16" x 3-1/8" x 1-1/2" inches. Carrying case available. Model B — \$5.90.

Price: \$24.90 — Postage \$2.20.

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This meter features double zener diode meter protection and 3-1/2" full view easy to read 2 colour scale. It is fitted with polarity reversing switch housed in a strong moulded case with carrying handle.

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AC/V: 10V, 50V, 100V, 500V, 1,000V (10,000 ohm/V).

DC/V: 5V, 25V, 50V, 250V,

500V, 1,000V (20,000 ohm/V).

DC/A: 50 uA, 2.5mA, 25mA.

OHM: 60K ohm, 5M ohm.

Capacitance: 100pF to 0.1uF.

0.01uF to 1uF.

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Audio Output: 10V, 50V, 120V,

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\$16.90 — Postage \$1.50.



\$3.75
POST \$1.00

CT-500 — \$24.90 — Postage \$2.50

Postage, medium-size, mirror scale. Overload-protected.

AC/V: 10V, 50V, 250V,

500V, 1,000V (10,000 ohm/V).

DC/V: 2.5V, 10V, 50V, 250V,

500V, 1,000V (20,000 ohm/V).

DC/A: 50 uA, 5 mA, 50 mA,

500 mA.

OHM: 12K ohm, 120 K ohm,

1.2M ohm, 12M ohm,

dB: 20 dB to +62 dB.

Approx. Size: 5-1/2" x 3-5/8" x 1-1/8". P&P 50c

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Red Dot: Woofer; Orange Dot: Midrange; Blue

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amateur radio

QSP

ADVANCING THE STATE OF THE ART

Published monthly as its official journal by the Wireless Institute of Australia, founded 1910.

JUNE 1977

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What do we all understand by "advancing the state of the art"?

Perhaps the use of Oscar satellites for long distance VHF/UHF communication, or maybe solid-state digital techniques for RTTY or SSTV, or even the use of UHF repeaters as an aid to mobile communication. Australian amateurs are indeed employing not only the above advanced techniques but also many more.

It is quite obvious, however, that "advancing the state of the art" will mean different things to different amateurs.

The 1296 MHz contact between VK5 and VK6 earlier this year excited many amateurs and raised the odd eyebrow world-wide. The sceptics will say "that if one waits long enough, of course the band will open" — maybe. One of the stations used SSB — SSB on 1296 MHz! — what's the point? Why there aren't many commercial VHF SSB systems in use — let alone SSB on UHF or SHF!

In VK2 a small band of microwave enthusiasts are quite active on most of the amateur allocations up to 10 GHz and over the years there has been sporadic activity on 1296 and 2300 MHz in VK3 with even less known activity in the other States.

In Europe, considerable effort is being put into popularizing the microwave bands. A recent report in "Radio Communication" (RSGB) mentioned a meeting of IARU Region 1 VHF Managers in Amsterdam where it was suggested that "given the effort over the next year or two, it is quite possible for amateurs to make a significant change in their use of microwave bands which could well influence our position at WARC '79".

The same article went on to mention that what is needed to stimulate activity on these bands is one or two proven, bug-free designs for equipment and LOTS more operating.

"Lots more operating" is certainly needed in Australia, especially on the higher frequency amateur bands. So there is a need for amateurs — who are involved in state of the art activities — to inform others of their work.

Tell us what you are doing.

P. A. WOLFENDEN VK3ZPA.

Chairman VHF/UHF Advisory Committee.

QSP

AMATEUR EXAMINATIONS

The August AACP theory exam, we are told, will be of the usual essay-type question.

However, it is likely that the February 1978 exam is going to be of the objective, multi-choice format.

The Federal Education Committee wishes to assist the P and T Department to produce an exam bank of suitable questions. We therefore invite questions, preferably typewritten (indicating in pencil the correct answer), to be forwarded from all States.

This is an opportunity to assist the P and T Department to develop a bank of questions at a depth level which is generally accepted as satisfactory for amateur exams.

The format of Novice 5 w.p.m. CW exams is being investigated with P and T Department. The main question is spacing of characters in letters and between words. This is being closely looked at, and it is hoped that agreement can soon be reached on a satisfactory format for the exam.

VK3ZRP

1977 CALL BOOK

Your last opportunity to be listed correctly in the 1977 Call Book is NOW. If your address label is incorrect in any detail this error will go through to the Call Book because the listings will derive from the same EDP file. Write now. This applies to any changes in call sign or the addition of any call sign or any different call sign to the one listed in the 1975 Call Book. Zones, clubs, groups, repeater groups, school clubs and others please take note and act on the above now. Next week will be too late.

2M BEACONS

From Radio ZS of January 77 comes news that the first two metre beacon was put into operation at Alverton near Durban as ZSSVHF on 144.925 MHz. Five other beacons are planned for the Republic — Cape Town, ZS1BHF on 144.92 MHz, Grahamstown ZS2VHF on 144.91, Hammersmith ZS4BHF 144.90, Johannesburg ZS6JHB 144.915, and Potgietersrust ZS7TIB on 144.905 MHz. Yet another beacon now in operation is in Mbokane Swaziland, 3D6AX on 144.735 MHz.

NEW PREFIX

For the period 4th June to 12th June this year the prefix GE may be heard in place of the familiar G, GM, GW, etc., prefixes. This was stated to be a one-off concession to mark HM the Queen's Silver Jubilee celebration. Radio Communication April 77.

1976 VK/ZL/OCEANIA DX CONTEST

1. Almost 1,200 logs were received.
2. Entry of ZL2GJ was omitted from Phone results — 1,355 points.
3. An error was made in ZL 40 metre CW results. ZL1AMO with 7,620 points was THIRD and not ZL1AH.

ZL2GX



FT-301D

All Solid State

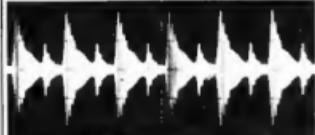
Digital Readout HF Multi-Mode Transceiver



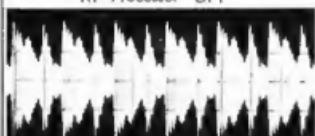
The FT-301D is an advanced fully solid state Digital Readout SSB, AM, FSK and CW transceiver covering 160mrx thru 10mrx including one auxiliary band and WWV. It has all the outstanding features of Yaesu's top performance FT-101E (inc. RF Processor) plus many more additions (Digital Readout, I.F. Rejection filter, & switchable AGC time constant).

RF. PROCESSOR

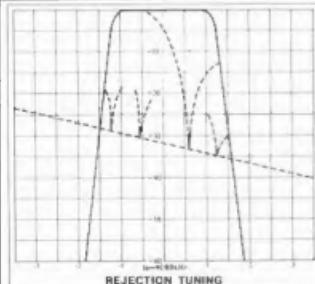
The RF Processor increases talk power to cut through the pile-ups without addition of a linear amplifier.



RF Processor "OFF"



RF Processor "ON"



FEATURES

- All Solid State — 27 IC, 47 TR, 24 FET and 94 diode
- All Band — 160 through 10 meter plus receive only for WWV/JU
- All Modes — SSB (USB-LSB selectable) CW, AM and FSK
- Digital Dial Readout — by large LED diode
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- IF Feedback — for clean signal
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- RF Processor — for increased talk power
- Built in fully adjustable VFO
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- Selectable, amplified AGC system — SLOW, MEDIUM and FAST
- Built-in internal crystal control (11 channels) provision and dual VFO adapter
- Adjustable carrier level for tune-up and novice operation
- Triple protection circuit for PA stage and warning system
- 8-pole SSB filter for unparalleled selectivity
- Build in speaker
- Compact size, light weight
- Complete line of compatible accessories for flexible station design

TECHNICAL DATA

GENERAL

Frequency Range: 1.8—2.0 MHz, 3.5—4.0 MHz, 7.0—7.5 MHz, 14.0—14.5 MHz, 21.0—21.5 MHz, 27.0—27.5 MHz, 28.0—29.9 MHz, WWV & MHz (receive only). Modes: SSB, CW, AM, FSK, CW with sidetone, FSK. Frequency Stability: Within 100 Hz during any 30 minute period after warm-up. Not more than 100 Hz with 10% line voltage variation.

FT-301D Accessories everything you want in a complete home station design.

YAESU's years of experience in the radio amateur field are exemplified in the FT-301D series. The FT-301D can be interconnected to its matching power supply, external VFO and monitor scope.

This feature provides you with a completely integrated home station with transceiver operation on either

VFO split frequency or crystal controlled operation with a flip of the switch. The FT-301D with built-in speaker is a complete radio power supply and can be used for any of the following supply voltages: 100/110/117/200/220/234 Volts, 50/60 Hz. A digital clock and

AC Power Supply FP-301D

AC Power Supply FP-301

External VFO FY-301

automatic call sign identifier are an integral part of the power supply. The time display can be selected for either a 24-hour or 12-hour system. A flip of the switch on the front panel, a programmable identifier transmits your call sign in morse code automatically every ten minutes.

Monitor Scope YO-301

PRICES

FT-301D inc. AM Filter	\$1147
FP-301	\$169
FP-301D	\$289
FY-301	\$149
YO-301	\$345

Above prices include S.T. Freight and Insurance is extra.
90 day warranty. Prices and specifications subject to change.

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FRED BAIL VK3YS
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JAS7677-22

WIANEWS

A special report on the 1977 Federal Convention will appear in AR next month. It is not intended to duplicate news items from the Convention but one or two deserve earlier publicity.

"CB"

This is the Position Paper, relating to CB, adopted at the Convention after very considerable discussions in a working group and later in the Convention itself —

1. That the Amateur Radio Service is accurately defined by ITU Regulations.
2. That the "CB" type operations by non-technically qualified operators is entirely different in character from the amateur radio service.
3. That a "CB" type service could not be regarded as part of the amateur radio service.
4. That it is highly undesirable and totally unacceptable to combine "CB" and amateur radio on the same frequency band.
5. That all radio services should be subject to regulation and that regulation should be enforced. Unlawful use of spectrum space, particularly that allocated to legitimate services, should be subject to prosecution.
6. That without expressing judgement on a "CB" service as such, other established services should not be required to give up frequency allocations for such a service.
7. That the usage of frequency by a "CB" type service should not be in derogation of the ITU Convention and Regulations (e.g., an avenue for international communications).
8. That the introduction of a "CB" type service must not in any manner result in or contribute towards the reduction or unwarranted variation of conditions applicable to the amateur radio services or which would result in the imposition of conditions less advantageous to the amateur in respect of present technical standards."

ARNOLD REPORT

After very considerable discussion the Convention authorised the issue of the following statement about the Investigator's Report by Bob Arnold (as published in AR April 1976) —

"In not adopting the Report the Federal Council noted that the organisational proposals were not considered to be appropriate at this stage, but that the other recommendations were being actively considered by the Executive and in a number of cases had already been adopted and implemented, namely —

Federal News: 1. News Tapes:

Communication has been improved between the WIA Executive office and members by the use of weekly broadcast tapes for propagating up-to-date information. Not only are these tapes being used for Divisional broadcasts but they are also being used as part of broadcasting stations' Amateur Radio News programmes (in Victoria 3CR and 3HA make use of tapes supplied by the Victorian Division).

2. WIANEWS:

In addition to the broadcast tapes stop press information to members and clubs has been stepped up via WIANEWS and inserts in Amateur Radio magazine. This regular feature aims to cover relevant items of news from sources both within Australia and overseas."

CALL BOOK

The Institute has been successful in negotiating a new contract with the P and T Department for the publication of call books over the next 10 years. These call books will be making use of the Institute's EDP (computer) records to improve accuracy and reduce the workload associated with the publication of this very important document.

MEMBERSHIP DRIVE

In an effort to increase membership of the Institute a campaign ("8000") was implemented during 1976. This membership drive is especially important when it is realised that WARC 79 is only two years away. It is proposed to continue this campaign with vigour.

SCALAR

for Antennae



Illustrated is a BASE STATION ANTENNA. Omnidirectional Gain 3 dB and 6 dB Models G11, G21, G22.

Scalar's range of HIGH GAIN base station antennas provide an omnidirectional radiation pattern combined with gains of 3 dB and 6 dB depending on Model number. They are designed as base station antennas for two-way radio systems. Constructed of high grade aluminium, the radiating elements are completely enclosed within a fibreglass radome.

C.B. CITIZEN BAND AND PAGING ANTENNAS
MARINE AND MOBILE H.F.
TUNEABLE GROUNDPANE ANTENNAS
SIDE MOUNT DIPOLES
COAXIAL DIPOLES
HIGH GAIN ANTENNAS
DISCONE ANTENNAS
FIXED FREQUENCY GROUNDPANE
ANTENNAS —
MOBILE COAXIAL DIPOLES
UNITY GAIN — (FIBREGLASS) WHIPS
4.5 dB GAIN (FIBREGLASS) WHIPS
PHASED SIDE MOUNT DIPOLES
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HELICAL WHIPS — 8ft, 8ft, 12ft, 15ft.
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QLD: Ph: 371-5677 **WA:** Ph: 42-6666 **SA:** Ph: 42-6666

WIA PUBLICATIONS

The Institute is currently investigating the feasibility of publishing an "Amateur Radio Year Book" for sale to the public through normal commercial outlets. The present procedures for publishing and distributing Amateur Radio magazine have also been reviewed and at this time are considered to be satisfactory as they stand.

(Note by Editor: Any ideas about what the Year Book should contain and anything else relating to it would be most welcome.)

P AND T DEPARTMENT DISCUSSIONS

The relationship between the WIA and the P and T Department continue to be close and cordial. During the year constructive discussions have been held on such matters as Novice licensing, the Call Book, WARC 79, "CB", repeater licensing conditions, amateur examinations, etc. It was also noted that officers of the P and T Department attended the 1977 Federal Convention (as they have in the past) and many views were freely exchanged.

OFFICE

Executive office procedures have been reviewed and streamlined wherever possible to achieve maximum efficiency at minimum cost. This question is under constant review.

FINANCIAL

The Convention passed a motion that the Federal element of the 1978 subscriptions be determined not later than 31st August, 1977. Another motion was passed "That for funding WARC 79 expenses a levy be imposed on each Division at the rate of \$2.00 per member at the time of the 1978 subscriptions invoicing, such sum to be paid prior to 31st March, 1978, by the Divisions in respect of their members". A budget for 1978 was adopted.

MORE "CB"

A meeting was held in Canberra with the Minister for Posts and Telecommunications, Mr. E. Robinson, during the evening of 27th April. Mr. D. Large, who wrote the report to the Minister on the introduction of a Citizens' Band Service in Australia, attended. On the WIA side were the Federal President, Dr. D.

GSP — continued

RUSSIAN SIGNALS VEHICLE FOR WIRELESS ELECTRICITY?

OTTAWA (CP) — A communications department official said Tuesday the Soviet Union has sent out since July a series of powerful radio signals that have disrupted communications at various times throughout the world.

The signals have also fuelled speculation that the Soviets are trying to develop a system of transmitting electrical power without wires, a possible solution to global energy troubles.

W. W. Scott, director of the department's operations branch which has been monitoring the Soviet signals, said the experiments prompted a rash of protests, including from Canada, Great Britain, the US and Scandinavian countries, which were particularly affected by the disruptions.

As a result, the Soviets cut back the experiments, "but they had been just go, go, go almost on a continuous basis," Mr. Scott said.

He said there is no evidence about the purpose of the signals, which he called amazing and puzzling. "But you have to keep an open mind. There are so many strange things going on today in science."

Followers of the turn-of-the-century Yugoslavian inventor Nikola Tesla are convinced, however, that the signals are part of a Soviet attempt to transmit electrical energy by using the earth as a conductor, one follower said.

Andrew Michrowski, an Ottawa architect and member of the Planetary Associa-

tion for Clean Energy, an international group trying to resurrect Tesla's work, said the implications of such a system are overwhelming.

Mr. Michrowski said in a telephone interview that Tesla's invention, called a magnifying transmitter, would make it possible to send electric power anywhere in the globe at the speed of light with up to 15 per cent less energy loss than present systems and without costly networks of wires and transmitters.

The technique could also be an efficient means of tapping solar energy, of controlling the world's climate and of enabling plants to grow with less sunlight and water, Mr. Michrowski said. Although the exact effect has not been worked out, it could result in oranges growing in Saskatchewan.

The magnifying transmitter also has enormous potential for destruction if abused or misused, he said. For instance the system could cause earthquakes.

In simplified terms the Tesla system links the generally negative particles of the earth's atmosphere with the generally positive particles of the earth's atmosphere with the generally positive particles in the earth, Mr. Michrowski said.

Tesla is said to have had one of his machines working in northern Quebec and it was used for several years to power a laboratory about 100 miles away, Mr. Michrowski said.

From "The Tribune", Winnipeg, Manitoba, 2-277.

Submitted by Frederick Phillips VK2ZQ. ■

Wardlaw VK3ADW, Mr. M. J. Owen VK3KI, Mr. T. Mills VK2ZTM, President of the NSW Division, and various members of the NSW Division "CB" Investigating Committee, including Mr. S. Kuhl VK2ZSK, C. Jones VK2DD, and D. Dwyer VK2ZCC. Mr. E. W. Howell VK1TH, also attended.

The Minister was unable to extend his stay at the meeting but discussions with Mr. Large continued.

WIA PROJECT AUSTRALIS

The Annual Report of the Chairman of the WIA Project Australis Group was received and adopted by the 1977 Federal Convention. Mr. D. J. B. Hull VK3ZDH highlighted several problems in his report but one of the more important of these was the fact that because of other commitments he wished to step down from the role of Australis chairman in order to concentrate what time is available to him to the command station role. We noted that a number of enquiries from some very capable interstate people over the years offered help with the hardware, etc., but could not be taken up because of co-ordination difficulties. Further action relating to this activity was left in the hands of the Executive.

WICEN

The Federal WICEN Co-ordinators' annual report was very well received at the Convention as it highlighted a number of problems. Many members seemed apprehensive about joining WICEN but in discussions it emerged that the procedures to be learned were simple, minimal and commonsense. Nobody need have any fears of tedious learning before being accepted into WICEN as the message handling procedures were easy to assimilate but more importantly meant that a disciplined back-up service, such as that offered by amateur radio, was more likely to be accepted and used by State emergency service for the benefit of the community as a whole. An undesigned rabble involved with radio communications was something everybody feared. It was agreed to look into the feasibility of holding a WICEN Co-ordinators' meeting in the near future. ■

AFTER THOUGHTS

The values given in Table 1 for the article "Transitions in Coaxial Lines" (AR April 77, page 20) and reference No. 1 were incorrect. The correct values are as follows:

	D/D,	△/D,
	50 ohms	75 ohms
1.2	0.055	0.065
1.4	0.105	0.12
1.7	0.165	0.17
2.0	0.215	0.22
2.5	0.29	0.295
3.0	0.35	0.38
3.5	0.415	0.42
4.0	0.475	0.48

References.

1. SANDORF, H. N., Amateur Radio, 38: 7 (1970).

It's warmer up here!

NORTH QUEENSLAND CONVENTION

TECHNICAL SESSIONS & VISIT
PANEL DISCUSSIONS
FOX HUNTS — HOME BREW
FAMILY ENTERTAINMENT

23rd, 24th July

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THE EFFECT OF GROUND ON THE DIRECTIONAL PATTERN OF A 14 MHz ANTENNA

A light aeroplane was used to measure the directional pattern of VK3MO's 14 MHz antenna system. Two three element monoband beams are stacked at 30 m (100 ft) and 14 m (45 ft). Field strength measurements were taken in two directions which have differing ground conditions. This allowed an estimate of the effect of the ground conditions on the performance of the system. It was found that the lobe in the preferred direction was 2 S points stronger than the direction with less favourable ground conditions, and this lobe was at one half the angle of radiation.

There are considerable advantages for the ham whose antenna has a low angle of radiation. Openings occur sooner for him, and last longer, because he can use the ionosphere which is just coming over the horizon. His neighbour must wait for the ionized region to rise higher above the horizon.

Also, even when the band is open to both hams, the lower angle of radiation means the DX can be reached with fewer ground and ionospheric reflections. Each of these reduce the strength of the signal.

Ground conditions considerably effect the direction of the major lobe of an antenna system. They can reduce the available signal power because of the effects of resistivity. Perfect ground, which is a flat ideal conductor, would give greater power to the lobe than a resistive ground. But how much power is lost, and by how much is the angle increased? The direct measurements from the plane were to help find out.

THEORETICAL PREDICTIONS

The effect that flat resistive ground has on the magnitude of the lobe can be computed theoretically. It has been shown to slightly reduce the magnitude of the maxima of the directional pattern of the antenna. A representative figure for this effect has been given as .1 dB, the sea being .1 dB better than dry earth.

The angle of the directional pattern of the antenna over ground is determined by both the free space pattern of the antenna and the directional characteristics of the ground. It has been suggested that the directivity of the free space pattern does nothing to the vertical angle of the lobe. This would mean a 3 element yagi would have the same angle of radiation as a dipole. However this is not the case. The contributions of the ground and of the antenna are superimposed; it is the product of the two which gives the overall pattern.

The antenna under test has stacked 3 element yagis. The higher yagi is at 30 m (100 ft), and on the 20 metre band this is 1.5 wavelengths. Theoretically, a dipole at this height would have a lobe at 9.6° to the horizontal.

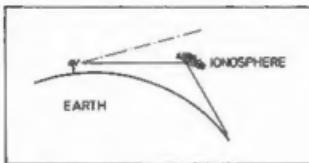


FIG. 1: Openings are longer with Low Angle of Radiation.

MEASUREMENT TECHNIQUES

A TS520 receiver was taken aboard a light plane which had a 1.5 metre long antenna tied securely between the landing wheels. The S meter of the TS520 was used for the field strength readings, and the antenna under test was energized with a 5 watt carrier signal. Later, a calibration curve for the S meter was obtained using reasonably accurate instruments.

The plane flew at various heights and 2 sets of signal strength readings were taken. In the westerly direction one set was at 3 km from the antenna, and the other set was a 1.5 km. Then the antenna was turned south and the signal strength measurements were repeated, south of the antenna this time at distances of 2.5 km and .8 km.

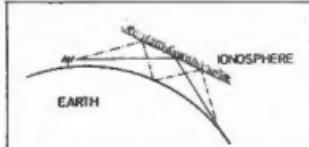


FIG. 2: Fewer Reflections are needed with a Lower Angle of Radiation.

RESULTS

The directional pattern of the antenna was calculated using the calibration curve for the S meter of the TS520, and by making allowance for the distance of each measurement from the antenna. For the purpose of calculating this distance and the angle of the radiation it was assumed that the emitted radiation was from midway between the stacked 3 element yagis.

A. G. Bolton VK5TT,
and I. J. Williams VK3MO
3 Illard Street, Vale Park 5081, S.A.

Diagram 3 shows the field intensity as a function of the angle of radiation for each of the 4 sets of readings. Diagram 4 shows the terrain in the western direction, and diagram 5 shows the terrain in the southern direction.

INTERPRETATION OF THE RESULTS

1. The comparison between the readings in the western direction at 3 km and at 1.5 km show the radiation pattern changes even after distances in excess of 50 wavelengths. This suggests that ground conditions at this distance still have an important effect on the performance of an antenna system such as the system under test. It would be reasonable to assume that the ground conditions at these distances would be less important with less directive antenna systems.
2. The angle of radiation of the lower lobe (4 degrees) clearly illustrates the importance of free space antenna directivity on the directivity of the antenna system over real ground. The contribution from the ground alone is at 9.6 degrees to the horizontal.
3. The signal to the west is far stronger than the signal in the southerly direction. There is a 12 dB advantage and it has half the angle of fire. These advantages could be attributed to three factors.
 - (a) The house and garage south of the antenna. These are .5 wavelengths away horizontally, and only .25 wavelengths below the lower beam.
 - (b) The rise to 10 m and 120 m from the antenna in the southern direction. This field also has 20 m high trees on it.
 - (c) The differing soil resistivities. The soil in the preferred direction is volcanic and south of the antenna the soil is sedimentary.

It is difficult to isolate the individual contributions of these three effects. The average rise of the ground south of the antenna is 4° for the first 150 m. This might account for the rise in the angle of fire of the antenna in this direction of approximately 4°. The trees at 150 m are 20 m tall and therefore level with the top

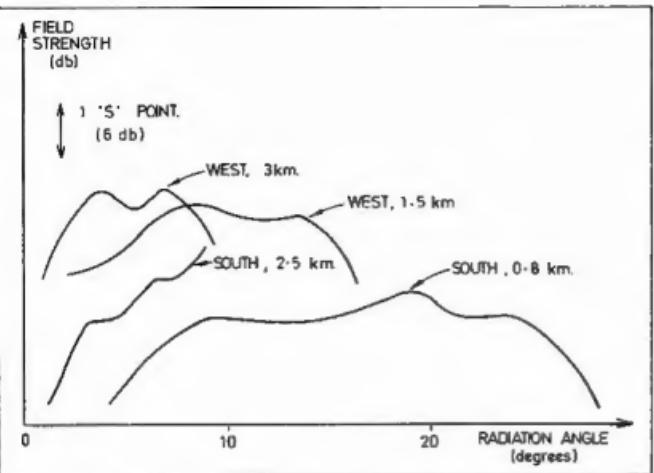


FIG. 3: Results of Field Strength Measurements.

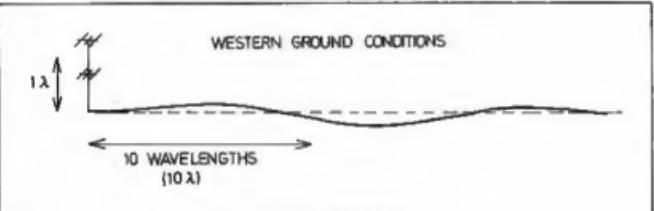


FIG. 4

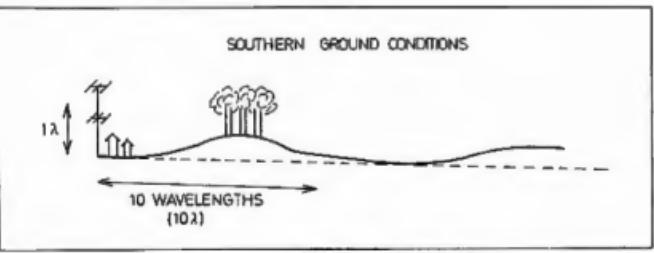


FIG. 5

of the antenna. This might account for the lower power in the lobe, though the antenna pattern would also be modified by the proximity of the house. It seems unlikely that the house would account for a difference of more than 3 dB in signal intensity, since the yagis are fed at the same power level. The resistivity of the soil may also account for a considerable loss in lobe strength, though simple theory suggests otherwise.

One point is clear, level conductive soil is worth at least 2 S points over ground conditions which are still better than most.

SUGGESTIONS FOR FURTHER WORK
It was very rewarding to actually measure the field intensities of an antenna system from an aeroplane. There was a wealth of information available. Using this method, for example, it was possible to count no fewer than 10 minor lobes in the direction of fire of the antenna. However there are a few suggestions for those undertaking further work.

Measurements should be taken at a greater distance than 3 km from the antenna. The results obtained in this test were adequate to demonstrate the con-

siderable effect of the ground conditions, but accurate measurements of the final directional pattern must be made much further from the antenna.

The problems involved with using a light plane need careful consideration. We were fortunate to have the enthusiastic support of Mr. Arthur Glosster. Arthur is a foundation member of the Kyneton Aero Club, and is also involved with antenna patterns professionally. This experience helped a great deal in the planning stages.

Do not underestimate the difficulty of flying to a particular point in the sky. The experience of our pilot, Mr. Paul Tetley, includes aerial photography and crop dusting. This is very important if reliable measurements are to be made.

CONCLUSIONS

With planning, the use of aeroplanes in antenna measurements is convenient and extremely informative. The measurements made during this test confirmed our worst suspicions that hams already have about the importance of a good location. It remains to show the relative importance of individual factors such as hills, trees, soil resistivity and adjacent buildings. Further measurements to isolate these factors would be invaluable to the ham who is choosing a location.

ACKNOWLEDGEMENTS

We are very grateful for the invaluable help of Mr. Arthur Glosster who helped us plan the details of the navigation, antenna installation on the plane and the method of obtaining the measurements.

Also, Mr. Paul Tetley's skill in piloting the plane with sufficient accuracy was essential to obtaining the test results, and we appreciate this contribution.

REFERENCES

1. R. E. Terman. *Electronic and Radio Engineering* (4th edition), pp. 885.
2. QST November 1975, pp. 21. "Pattern Factors for Elevated Horizontal Antennas Over Real Earth." H. K. Landskov.
3. *Radio Handbook* (18th edition), pp. 45.

QSP

REPEATERS

A compilation of 2m repeaters within a 80 mile radius of the Empire State Building in New York reveals 97 all told. QST February 77. And we think we have problems here!

7th SEANET CONVENTION

A letter from HS1WR, President of RAST, advises that the 7th Annual SEANET Convention will take place at the Erawan Hotel, Bangkok, from Friday, 18th November, 1977, to Sunday, 20th November. Details, including special tours such as the Festival of Lights and the Elephant round-up at Surin, and forms for attendance are available on application to SEANET or the Executive Secretary, 7th SEANET. Also given are the SEANET 77 Contests on CW 8/10 July and phone 20/21 August—details available from 9M2PK. Visitors to Thailand should note that the importation of communications equipment is forbidden except on prior authorisation from the Royal Thai Government.

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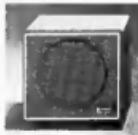
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WEAR!

AN AUDIO PHASE-SHIFT NETWORK FOR SOLID STATE PHASING SSB

Roger Harrison VK2ZTB
14 Rosebery Street, Balmain 2041

While investigating suitable circuits for a solid-state phasing SSB rig I came across an article by Robert Cheek (then W3LOE) in the November 1948 issue of CQ (page 17) entitled "Single Sideband For Everyone". Naturally, it described a valve rig, but it used a passive phase-shift network that not only intrigued me, but exhibited very good characteristics. The circuit was an R-L-C network and is given in figure 1.

It has the advantage of a low-to-medium input impedance and thus may be suitable for solid-state circuitry, together with the unique advantage that the quadrature output ports can drive a low impedance—in the order of 400 to 600 ohms. Just what the doctor ordered for solid-state gear! The sort of audio phase-shift networks popularized at that time involved either active or passive R-C networks. The latter inevitably required very high impedance loads on the quadrature output ports or a stable, well-defined high impedance load. Solvable, but awkward. Active audio phase-shift networks, while attractive for other reasons, do not have the elegant simplicity of the passive networks. Increased circuitry is required and the alignment necessary is a drawback in many circumstances. Besides, I didn't feel like getting into that just yet.

Anyway, however the circuit was going to turn out, I was interested in giving it a go. The original article specified a modified audio transformer for T1 and L1 and a power supply choke for L2. Some modernization was necessary and so some suitable pot cores were tried. The results of design and adjustment are given in the parts list.

COMPONENTS:

According to the original article, components are relatively non-critical and standard 5 per cent or 10 per cent types may be used. The main requirement is that each 40 mH inductor must resonate with the 1 uF capacitor at 800 Hz. The exact values appear to be uncritical so long as components of the nominal value specified are used. L2 and the 6.2 nF capacitor must also resonate at 800 Hz. The exact frequency has no particular magic about it, 800 Hz being the geometric mean between 160 Hz and 4000 Hz which adequately covers the speech band. It is sufficient to ensure that each LC circuit resonates to the same frequency. The reactance of each of the 1 uF capacitors and the 40 mH inductors is about 200 ohms at 800 Hz.

Another alternative for the 40 mH inductors would be to use the 88 mH toroids beloved of RTTY enthusiasts. These consist of two 44 mH coils wound on a toroid and connected in series. They can be obtained quite cheaply from local sources or overseas. Using a CRO or VTVM and an audio oscillator it is a simple matter to resonate a 44 mH winding and a 1 uF capacitor to 800 Hz. Remove turns from a 44 mH winding until resonance is achieved. This sort of method may be used regardless of what coils are used.

Locally available toroids may be used to construct T1, L1 and L2 if desired, and details are given in the parts list.

The transformer, T1, consists of two windings connected in series, each having equal numbers of turns wound on the same core and resonated to 800 Hz with the 1 uF capacitor. The dots in figure 1 indicate corresponding ends (start or finish) of each winding.

CIRCUIT CHARACTERISTICS:

The input impedance is approximately 5K and should be driven either by a transformer, a phase-splitter stage or a differential amplifier. The quadrature output terminals, A and B, can drive a load impedance of around 400 to 600 ohms as mentioned previously, the characteristics of the network being largely unaffected by the actual load impedance—a distinct advantage over passive R-C networks which are quite sensitive to load impedance variations.

The speech amplifier preceding the network needs to include de-emphasis of about 4 dB per octave below 800 Hz as the network has a rising response in this region.

The characteristics of the network, from the original article, are as follows:—It will maintain the 90° phase difference between the output terminals within 2° from 300 Hz to 4 kHz and the amplitudes of the two outputs within about 0.3 dB of each other over the same range. There is a much smaller variation in both parameters between 400 Hz and 3 kHz. Thus, the

opposite sideband suppression that may be obtained is 35 dB at worst at the extremities of the speech band and at least 40 dB across the substantial portion of it. A sharp cutoff above 3 kHz (at least 12 dB per octave) is recommended for the speech amplifier. A similar cutoff below 300 Hz is also recommended.

The network has a midband loss of about 15 dB and thus the speech amplifier needs to have sufficient gain to overcome this loss and provide sufficient output for the following circuitry. Similar comments apply if the network is used in receiver applications.

The low output impedance of the network makes it eminently suitable to drive diode balanced mixers without messy matching problems.

The author's prototype performed much the same as that in the original article.

Well, don't just sit there—get your soldering iron out!

PARTS:

L1 = 176 turns of 26 B&S enamelled wire on single bobbin of VINKOR LA2330 pot core assembly
Or ~ 93 turns of 38 B&S enamelled wire on NEOSID toroid 12.7 mm OD by 6.35 mm ID by 9.52 mm height of F9 material.

L2 = 2090 turns of 42 SWG enamelled wire on single bobbin of VINKOR LA2330 pot core
Or ~ 7052 turns of 38 B&S enamelled wire on NEOSID toroid 38.1 mm OD by 25.4 mm ID by 19.05 mm height of F9 material.

T1 = Two windings, one on each half of a double bobbin of VINKOR LA2330 pot core, 176 turns of 34 B&S enamelled wire for each winding. The dot indicates the start of each winding.

Or ~ 2 x 93 turns (bifilar) of 38 B&S enamelled wire on NEOSID toroid the same as for L1.

*The 4.3K resistor, R1, may be a 3.9K in series with a 390 ohm, or 4.7K paralleled by a 58K resistor.

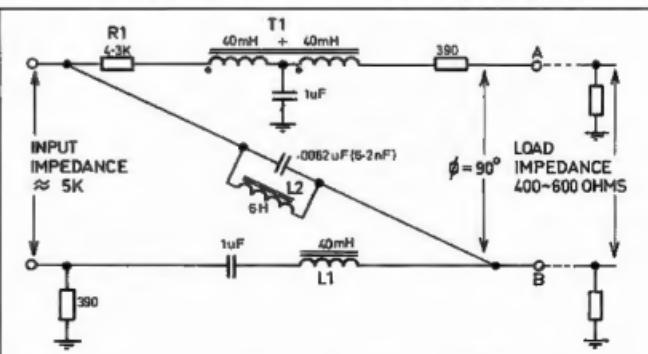


FIG. 1: R-L-C Audio Phase-Shift Network as described by Robert Cheek in Nov. 1948 issue of CQ.



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Wt 11 kg



YAESU FT-1000 Transceiver

SIMPLIFIED AUDIO FILTERING

Maurie Evered VK3AVO
13 Sage St., Oakleigh, 3168

If you wish to become an authority on audio filtering or construct a multistage audio filter of well defined characteristics read no further but pass to the adequate list of references at the end of this article. If, however you wish to construct a cheap and simple but very effective audio filtering system to help extract signals from background noise then read on.

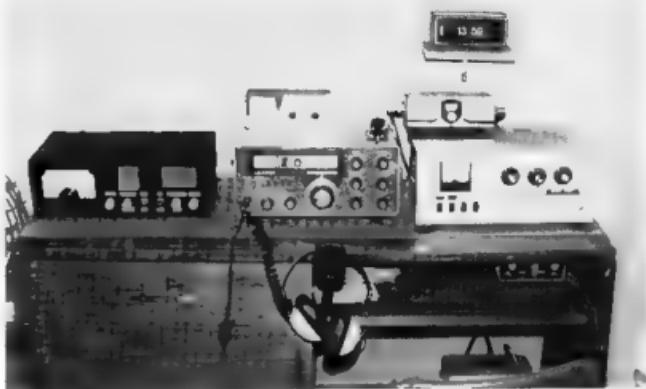
This system was inspired by three other AR articles (references 1, 2 and 3). Experience has shown that you need to be able to apply attenuation to both high or low frequencies depending on background noise conditions and the particular mode being received for example "high cut" removes excessive background hiss, "low cut" removes unwanted low frequencies from static or some particular voice characteristics heard on SSB.

The need to apply these principles was accentuated by the ever present background noise at this QTH, a light industrial area with 6 KV power lines about 50 metres from the antenna.

This situation is worsened when you consider the state of the Dx bands at present, a gams are much weaker than at the sun spot maximum of 1970 or so. The FT101 noise blanker is very effective against "ignition" type interference but values in effect against power line noise.

Let us examine briefly the principles we can apply to attenuate unwanted frequencies. I will call these the series and parallel methods. The series method requires inductance for high frequency attenuation (inductive reactance increasing with frequency) and capacitance for low frequency attenuation (capacitive reactance decreasing with frequency).

The parallel method requires capacitance for high frequency attenuation and inductance for low frequency attenuation. This approach was used as the parallel



VK3AVO's NEAT SHACK.

connection of components does not require the opening of any circuit wiring.

The audio filtering was applied in my case to a pair of eight ohm headphones which I always use for listening except when pottering in the shack. This method has the advantage that you do not have to modify your transceiver as all components are added "outboard".

This technique is shown schematically in Fig. 1. You connect either capacity or inductance across the phones to achieve either high cut or low cut as required; leave both disconnected and you have normal receiving conditions. You can mount these components directly onto the phone plug and use a clip to connect to either one (see photograph) or you can build the unit into a box that connects in series with phones and receivers.

The values of capacitance and inductance in Fig 1 were found by trial and error. To achieve the desired results you may have to alter them in any particular



CLOSE-UP OF AUDIO FILTER INSTALLATION.

case. A little experimentation will soon show what values of capacitance and inductance are needed.

In practice I use high cut for all CW and strong local SSB signals, low cut is useful when copying weaker SSB signals with a high static level.

One last word. Do not knock this filter because of its extreme simplicity, at least not until you have tried it. Anyone visiting my shack is welcome to a demonstration and I think you will be surprised with its effectiveness.

REFERENCES

- 1 Improving Loudspeaker Reproduction for SSB Dx. — B. Mann VK3BM AR September 1973 p 5
- 2 Improvements to the Loudspeaker Filter. — B. Mann VK3BM and P. Williams VK5NN, AR February 1975 p. 22.
- 3 Commercial Kinks — R. Fisher VK3OM AR September 1975, p 25.
- 4 Filter Designs Part 1 and 2 — Electronics Theory Handbook, p. 12 and 15.
- 5 ARRL and RSGB Handbooks. — Appropriate Sections.

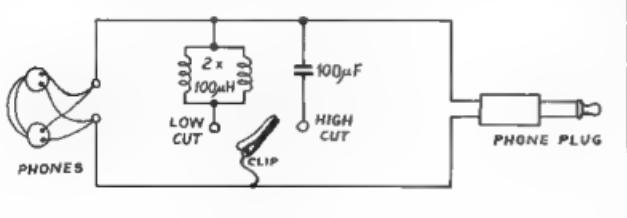


FIG. 1. FILTER CIRCUIT.

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	TH3JR 10-15-20 junior 3 el. Yagi 12' boom	\$160
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	Swivel mounts & chrome-plated springs for all	\$ 13
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	ANTENNA ROTATORS	
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	Model CDR AR-22 L junior rotator for small	
	beam	\$ 65
	KEN model KR-400 for all medium size hf	
	beams with internal disc brake	
	KEN model KR-500 for vertical control of	
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	All models rotators come complete with 230-	
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	KR-400-500	65 cents per metre
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PETER SCHULZ, VK2ZXL

Amateur Radio June 1977 Page 13

RADIO TELETYPE

Jostein Gjerde, LA7MC

Reprinted and translated from consecutive issues of "Amator Radio" — Published by the Norwegian Radio Relay League (commencing from A.R. No. 5, 1972)

PART 5

MORE ON AN RTTY CONVERTER WITH ACTIVE FILTERS

The diagrams referred to in this article are the same as those published on pages 11-14 of last month's issue of AR.

The description of the DJ6HP system is concluded in this article.

As in the circuit shown in Fig. 2 the converter shown in Fig. 6 has a capacitor added in parallel with the feedback resistance RR (R₁), thus causing the circuit to have a low pass filter characteristic.

For the adder in Fig. 2 the following applies:

$$-\frac{RR}{R_{e1}} \cdot U_{e1} + \frac{RR}{R_{e2}} \cdot U_{e2} \quad (7)$$

The time constant which the parallel capacitor causes has the value . . .

$$T = RR \cdot C \quad \dots \dots \quad (8)$$

You can therefore find the boundary frequencies for the circuit.

I

$$f_{\max} = \frac{1}{2 \cdot \pi \cdot R \cdot C} \quad (9)$$

If the two input voltage swings are nearly equal you get at the output an alternating voltage swinging about 0 with a maximum frequency determined by T. For RTTY amateurs, you set f_{max} to 40-50 Hz such that you can be sure that the signal will pass the filter.

After the low pass filter follows a non-inverting Schmitt trigger which is also made with the aid of an operational amplifier. This is shown separately in Fig. 4(a). The input and output waveforms are shown in Fig. 4(b).

For this circuit, the following apply (refer to Fig. 4(b)):

Switch on level . . .

$$U_{e PA} = -(R/R R) \cdot U_{a \min} \quad (10)$$

Switch off level . . .

$$U_{e AV} = -(R/R R) \cdot U_{a \max} \quad (11)$$

Coupling hysteresis . . .

$$U_e = (R/R R) \cdot (U_{e \max} - U_{e \min}) \quad (12)$$

For a large input voltage U_e becomes U_a — U_{a max}. If you lessen U_e, U_a will remain at the value U_{a max} until U_e reaches value U_{e off}. At this time U_a jumps to U_{a min}. This switching action is started by U_e, but thereafter it is decided by the coupling of R R.

The stable value U_{a min} is maintained until U_e exceeds the value U_{e on}. In

Fig. 4(b) is shown the input and output voltage waveforms. For a supply voltage of ± 15 volts for IC type 709 U_{a min} about —12 to —14 volts.

The following transistor T1 (5) acts as an inverter. It is coupled in or bypassed depending on whether normal or reverse shift is required, i.e. a higher or lower tone frequency could represent a mark frequency signal.

Transistor T2 is the keying transistor for the magnet current to the teleprinter. Here the current is supplied to the magnet through a variable resistance. The second magnet lead is coupled to earth through T2.

Transistor T2 must be able to break and close a supply voltage of 200 volts. (Alternatively a constant current low voltage driver could be used. Refer to AR Vol. 44, No. 3, March 1976, p. 7.—Ed.)

RTTY CONVERTER COUPLING

Operational amplifiers OP6 and OP7 in Fig. 5 are connected between the receiver low frequency output and the converter's diode input K (Fig. 6) and operate as additional active selection circuits with an amplification factor of about 25. OP6 lets 1050 Hz signal through. A 3 dB bandwidth of 50 Hz is chosen so that the slot keying impulses of 20 ms can swing fully and reach the maximum amplitude.

OP7 works in the same way at the same bandwidth, but here three preset shift frequencies can be selected by means of S1.

P14 is a 10 turn potentiometer and with the aid of this you can in position 1 cover a shift range from 0 to 1000 Hz continuously. P14 and P4 may be omitted if you limit yourself to fixed shifts.

At point K the signals are brought together and passed to the diode limiter at the input of OP1 and at the output of this they appear with a constant amplitude of about 25 volts peak to peak.

By using P1 and P2, Fig. 6, the input level for the resonant circuits OP2 and OP3 may be adjusted so that at the outputs MP4 and MP5 (after resonance adjustment) always appears as 8 volts peak to peak. Amplification factor for both circuits is about 0.5.

All other values match those for OP6 and OP7. If you use variable shift adjustment, it is recommended that P4 and P14 be mechanically coupled to enable operation of both selection circuits together so that they "track" together. Otherwise you adjust P4 first and then set P14 on the same scale adjustment.

The signal which is rectified by D3 and D4 goes into an active low pass filter OP4 where the limit frequency is again chosen such that the short key impulses increase to full amplitude.

The following Schmitt trigger has, with the stated resistance combination, a hysteresis of about 0.8 volts. You can also make the hysteresis variable by putting in a potentiometer of 500k ohm as R R (R15). This potentiometer must be limited to a minimum value of 50k ohm. The circuit hysteresis can be altered between 2.5 and 0.25 volts.

You can also wire OP5 as a comparator (change over plus and minus inputs and omit R15). It has been found advantageous to have hysteresis, otherwise OP5 will couple in with the weakest noise signals and the teleprinter will type nonsense.

The circuitry for T1 and T2 needs no further explanation. S2 takes care of switching from "normal" to "reverse" shift. S3 switches to "stand-by".

ADJUSTMENT OF THE CONVERTER

Necessary equipment—tone generator and oscilloscope.

(1) Remove D3 and D4. Select the lowest DC range on the oscilloscope and adjust the zero point on the screen when the probe is earthed. The probe is set on MP6 and you adjust P9 till the scope reads 0 volts.

D3 and D4 are soldered in place.

(2) Point K is uncoupled from the rest of the converter. You set the scope to MP3 and adjust to zero reading by means of P6 (fairly critical).

(3) You supply to point K a signal of 1050 Hz and about 1 volt peak to peak. The probe is set to MP4, the output voltage adjusted to maximum with P3.

Then the voltage on MP4 is adjusted to 8 volt p/p by means of P1.

(4) You connect to point K a signal of 120 Hz and about 1 volt p/p. Probe is set to MP5; output voltage set to maximum by means of P5. Then set the voltage of MP5 to 8 volts p/p by means of P2.

(5) Connect to point K a signal of 1475 Hz at 1 volt p/p. Voltage at MP5 is set to maximum by means of P6.

(6) Connect to point K a 1 volt p/p 1900 Hz signal. Voltage at MP5 is set to maximum by means of P7 (S1 must naturally in each case be at the right setting).

(7) Point K is reconnected to the rest of the converter.

(8) You connect to the input of the converter a signal of 0.1-0.2 volt p/p and frequency of 1050 Hz. The oscilloscope probe is connected to MP1. MP1 is adjusted to maximum voltage by means of P10.

(9) Repeat the same procedure at MP2 with P11, P12, and P13 with 1220 Hz, 1475 Hz and 1900 Hz as in instructions 2, 3, and 4.

(10) Disconnect X deflection of the oscilloscope. Points X and Y are joined to the corresponding X and Y inputs of the oscilloscope. The Y amplifier is adjusted to 0.5 volt/cm and X amplifier to the same value.

COMPONENT LIST FOR FIGURES 5 AND 6

CP1, CP5: 709 (without phase compensation see Fig. 6(a))

OP2, OP3, OP6, OP7: 709 (with phase compensation, as shown in Fig. 6(c)), or

741 wired as in Fig. 6(b)).

OP4: 709 with phase compensation or 741. See Fig. 6(c))

D1-D6. Si-diode IN914.

T1. BC107 or similar.

T2: NPN transistor for 250V breakdown or similar.

P1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13: Carbon (trimmer) potentiometer 0.25W.

P4, 14: Wire wound 10-turn potentiometer (Beckmann, Helipot or similar).

R1-R18 0.25W.

R19: 1W

R2, R29: 1% tolerance

C1-C6 30V.

C7: -400V.

BUILDING AND OPERATION OF THE CONVERTER

The construction of the apparatus and selection of components is not critical; you can use parts easily obtainable on the market (Refer to the WIA *Components* lists and the advertisers in this magazine.) The capacitors in the resonant circuits are not critical, it is not necessary to use styroflex capacitors. The resistances in the prototype have 5% tolerance. The apparatus is completely reproducible.

It is essential that the received signals and the station receiver must be extremely frequency-stable when the converter works as "two circuits" (AM reception) and with a bandwidth of 50 Hz. It will only show its advantages when the signals are maintained between these limits. If you want to operate surely over 10 minutes, the maximum allowable frequency drift is 25 Hz in any amateur band. Fortunately the higher frequencies usually come from mixing the VFO signals with signals from crystal oscillators, so that the stability requirements given here are realistic for good operation.

The converter compares favourably with the ST5 and ST6 systems. In the presence of QRM signals will usually be received more accurately with this converter. With this type of test you get a lessening of printing errors in proportion 2 to 3 provided the abovementioned stability needs are met.

The measurements are necessarily subjective but there are no norms which can give objective results.

Therefore I will not commit myself to the given typng error improvements as this will require the same measurement conditions.

In connection with typing errors because of fading disturbances, the converter described will be equally useful as the

ST5 and ST6 when you use the same principle to counteract this.

On the other hand, the performance of the ST5 and ST6 will fall sharply in comparison to the converter described where QRM from strong carrier waves is concerned.

Finally, it should be noted that this converter can neither perform miracles nor conjuring.

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MAGAZINE INDEX

Syd Clark, VK3ASC

BREAK-IN October 1976

History and Highlights of New Zealand Amateur Radio, The Zedel Keyer: A Controlled Hot-Me-Up for Your Crystal, Power Input Measurements for the Argonaut and Triton.

CG August 1976

KC4NI Navassa Island 1974; Logic Probes, A Simple One, The Two Meter Fishing Pole; Victory at Sea; Heathkit SB-514 (Review), Another 5/8 Wave Antenna for 2 Meters, Relativity in the Ham Shack, A Free Standing Crank-Up Tower for \$30.

October/November 1976

Destination Agalope, A Modular Linear Amplifier, An Intermittent Ton: Long, Long Dipoles; Try This for Selectivity, Heathkit HR-1600 Receiver (Review), Steuthing the Russian Weather Satellites.

HAM RADIO September 1976

Two-Metre Transverter, Digital Frequency Readout for Transceivers; Solid State Morse Keyboard; UHF Dummy Load; Hand Held Calculators; Solving Radio Problems; Automatic Beeper for Station Control; Turn-off Timer for Portable Equipment; Audio Frequency Shift Keyer; Calibration of AD Meter Scales; 10 amp. Voltage Regulator, Cleaning Printed Circuit Boards; Trouble Shooting Transistor Circuits; Micro-processors.

November 1976

Wireless HF Auto-transformers, Audio Filters for SSB and CW Reception; Very Low Frequency Receiving Converter, Electronic Bias Switch for Negative-biased Power Amplifiers, RTTY Test-message Generator, Practical Crystal Filter Design, Using Your Pocket Calculator for Transmission Line Calculations, Power Supply Servicing, Binsural Synthesizer Filter; Calculating Line of Sight Distance; Microprocessors.

QST August 1976

Meet the Microprocessor, Part 1 of 3 Another Look at Reflectors, Pt. 7; An RF Sensed Antenna Changeover Relay Designing SMA Vertical Antennas, That's a Big 12 Volts, A Unique Digital Mixer, Rid Your Model 2D Unit of Distortion Loops vs. Dipole, Analysis and Discussion; One Shoe Drips, Once Upon a Time, Radio Fox-hunting in Europe Put the Ham in the Closet, The Value of Special-Events Stations.

October 1976

Radio Astrology, An Inexpensive Sweep Frequency Generator, Designing Linear Power with Integrated Circuits, Pt. 8; The Clock's a New Twist, Meet the Microprocessor, Part 3, A Low Cost Touch-Tone Encoder, OSCAR Medical Data, A West Coast VHF DXcondition, Public Relations, An Emergency Co-ordinator's View; ARRL Bond Plans, On Signal Strength Evaluation, DX QSL's, The Flip Side, Amateur Radio in Action, Tiers Lunes para Colombia

November 1976

SSTV Image Processing, A Side Mount Rotator for a Large HF Array; The Synthscamcer The VFO Frequency Divider, For Accuracy, Go Wheatstone; The Code At Your Fingertips; The Ugly Deckling; A General Purpose Audio Amplifier;

Radio Fox-hunting in Europe, Pt. 2, A Tip of the Hat, Worked All States on 144 MHz, Noves Extend Above Horizons, The Oscillocar, A Cal to Arms; Great Britain Interference Survey, From Whence Came Ham Trolls for Amateurs, and the President

RADIO COMMUNICATION October 1976

A Pata Line PA for 432 MHz, Practical Design for a Capacity Hat Loaded 14 MHz Mri-Qquad; Learning about Logic, Pt. 5

November 1976

Timeburst and Time-out Indicator for the IC22A, An Economy VHF Dp Meter, Learning about Logic, Pt. 6; The Heathkit HW-1 Low Power Transverter (Review), Yaesu FTV 450B 70 MHz Transverter (Review), Tropospheric Disturbances to VHF Radar Signals.

December 1976

Some Experiments with High Frequency Ladder Crystal Filters, Low Pass Filter (Summary), A Receiver for 144 MHz, The FDK M-111-U11 (Review), Scopes 45-6 Single Beam Oscilloscope (Review), Tropospheric Disturbances to VHF Radar Signals.

BREAK-IN January/February 1977

University of Canterbury Electric Town Car Wind Generator Field Controller and Inductor, Resonant Choke for VHF, Tuning Ratios; Power Supply for Solid State Transceivers, The Fred Dagg Special; Using Hydraulics for Lifting Towers

CG April 1977

Jung & Fles Power, The Milen 90873 Antenna Bridge; Heathkit SB-230 1 kW Conduction Cooled Linear; The Palomar Engineers RX-Niles Bridge Slow Scan Television Over 77, Pt. 1; The M-111 and Trap Antenna, Pt. 3; Broadcasters Threaten Take-over of Amateur UHF Band at WARC 79

RADIO COMMUNICATION March 1977

A Third Method SSB Generator, Modifying 120/128 Line SSTV Equipment to Transmit and Receive 240/256 Line Video; Moon Boring for Aurora Propagation; The Yaesu FRG7 Receiver RTTY Begs on Terminal Unit 1

SHORT WAVE MAGAZINE January 1977

Digital Electronics Keyer Transceiver for Eighty Metres Transmitting Antennas for Small Gardens Vehicle Noise Suppression for Mobile Operation (Morris 1000)

73 January 1977

SSTV Test Generator; How Does Your Rig Perform, Ari and the PC Board The New 88 Channel, C-22 A No Hands Telephone, C-22, What's the Best Antenna for 160, Ten Meters Dead or Alive, 200 lb Cockie, Weather Satellite Smoother, An Automatic Thermal Modulator for the Heath 10-102 Scope, The UHF Connection, Go Forth and Multiply, How to Find a Reliable Memory, A Super Log, Short on Memory, A Software Review, Meet the Multin Fan, 1000 WPM Morse Code Type, It Works the First Time, The New Improved TT Decoder Updated, The Poorly Changers, Repeaters in New Zealand, A VFO for Sidebands (Reprint from ARI), Practical Solar Power A Simples RC Substitution Box, The Companion Audio Driver, The Junk Box as an Art Form, The Mod Squad Goes 220, Double Sideband Sounding New Carbons as Your Crystal, How Does S-band Really Stack Up, Son of the Overload, Ready, No Wire Antennae Switch; The Beeper Ham Phone Answering Service, Dear Good Buddy, SWR Myth Exploded Again, Dirt Cheap Radiation on a Vest Pocket QRP Rig, So You Can't Solder or Weld, Exciting New Touchstones, IC, Reviving the CDR, The Mighty Magnet Mount Antenna, A 15.75 \times 2 Oscillator, Behaviour Mod for the HM-102

QSP

RECIPROCAL OPERATING

February 1977 QST contains a short article reporting that the Soviet Union's IARU Society RSF announced that foreign amateurs might operate in the Soviet Union on under a permit good for the thousands of club stations there, and possibly some individual stations. Applications must be made well in advance, through your local IARU Society (the WIA), giving a mass of information about your itinerary, etc.

NEW PRODUCTS

VICOM has pleasure in introducing the HAL range of products to Australia. This month we detail the KSR 3000 RTTY terminal which handles both ASC11 (8 level) and Baudot code switchers from the front panel. The terminal uses the powerful 8080A micro processor to handle the data and provides a composite video monitor for character editing facility, display up to 1152 characters and a cursor capability. The terminal can store 1000 characters in memory and provides a composite video output to the video monitor. The KSR 3000 has the following features: full keyboard and scrollable baud speeds 60, 66, 75, 100 and 132 baud. Incoming data is stored in memory and can be displayed down. After the bottom line on the page has been filled, the page scrolls up and the new data is entered on the bottom line. On transmit options modes are switchable.

1. **CHARACTER TRANSMISSION MODE.** Data is displayed as soon as a key is pressed but is transmitted only when a character following a space is typed. This allows for slow transmission of data by re-typing.
2. **WORD TRANSMISSION MODE.** Data is transmitted from the buffer and held until the RETURN key is pressed. Then an entire line can be typed and edited before transmission.
3. **LINE TRANSMISSION MODE.** Data is entered into the buffer and held until the RETURN key is pressed. The cursor can be moved to any position on the page and the necessary changes made.

The terminal also features "word wrap-around". If a word extends past the end of the line, this prevents splitting of a word at the end of a line by the automatic line selection. A special feature "block" allows for transmission of block codes whenever the output buffer is empty. This feature allows for continuous forming at full speed even though the typing speed might be less than full speed.

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30 DB BE LOW 1 UVR 5+/-NIN

60 DB OR MORE ATTENUATION

+/-7.5 KHz, +/-15 KHz/60 DB

-6 DB BELOW 1 Microvolt

1.5 watts or more into 8 OHMS

COMMERCIAL KINKS

Ron Fisher, VK3OM

3 Fairview Ave.,
Glen Waverley, 3150

This month a couple of handy hints, one for the ICOM IC-21A and the other a simple improvement to the popular Yaesu FRG-7 receiver.

THE IC-21A

Over the years this transceiver has proved to be extremely reliable. The one I use was one of the first sold in this country and has run up many hundreds of hours of use, completely trouble free, except for the dial and indicator lamps. They burnt out in the following order S meter, discriminator meter, receive indicator, and finally the main channel indicator. The transmit indicator is still going. Its life will depend on how much you talk. Enough to say that if you are an IC-21A owner it is worth having a couple of spare lamps on hand, they are easily obtainable from VCOM in Melbourne. In general they are easy to replace except for the main channel selector. More on this one soon. All connections go to a tag strip just to the centre of the S meter behind the sub front panel. Do not try to unsolder an individual connection — cut it off with a pair of small side cutters as close to the soldered joint as you can. It seems that all the leads were twisted together originally, so of course trying to remove one will result in quite a mess.

To replace the channel indicator lamp it is necessary to remove the front panel. Proceed as follows. Disconnect antenna, microphone and power cables. Invert the set and remove the bottom plate. Now remove the cab net. Remove the eight knobs plus the plastic washers behind seven of them. The front panel is held by four Philips head screws, one in each corner going from the sub front panel back into mouldings on the rear of the front panel. It will now come away but held to the main chassis with the connecting leads to the power and other switches. There is enough length on these to separate the panel and so gain access to the lamp. Next remove the black painted metal mask that surrounds the discriminator meter. This is held by two screws. You can now remove the discriminator meter and the two light baffles held by the meter mounting bolts. Be careful not to lose the two small nuts at the rear. Now with the meter out, the globe can be pulled from its grommet and replaced. Carefully retrace all the above steps.

All other lamps can be replaced with the removal of the cabinet only.

THE FRG-7

Having just acquired a Yaesu FRG-7 receiver I have been looking to see if any small improvements can be made. Over the next few months I hope to come up with a few more. One of the first things

noticed with the FRG-7 is that it is very difficult to read the S meter. The illumination of this depends on light reflecting from the main kHz dial. Unfortunately as the meter is set well forward of these lamps the scheme does not work, and so the meter face is in a shadow. Remedy: obtain one of the miniature 12 volt lamps with leads attached and secure it above the meter with a spot of contact adhesive. Take the leads to the three lug strip above the chassis just to the rear of the main dial. Modification complete, and the meter will now stand out like a searchlight. ■

an international gathering would be difficult to obtain. The WIA was hopeful that an Institute delegate would be included in the Australian delegation. Work on this was proceeding. It was most pleasing to report the very large voluntary contribution being made towards the upkeep of the Region 3 Association by Japan, and Mr Owen paid tribute to the work of the Association's Secretary, Mr. David Rankin 9V1RH/VK3QV.

Federal Council expressed thanks to Mr. Owen for his report and work in IARU and recorded appreciation for the work being undertaken by IARU President Noel Eaton.

The Federal President advised that so far very little feedback had derived from the last APG meeting at which the frequency requirements for all services had been submitted. Mr. Owen asked that thought should be given to fall-back positions and the necessity to consider details relative to the three new bands of 10, 18 and 24 MHz proposed for the amateur service. The order of merit of the various options must always be kept in mind. More information was required in respect of amateur work in the microwave region.

It is refreshing to record in this day and age the enormous amount of valuable work being carried out by the IARU for WARC 79 in contrast to the almost negligible contribution, so far as the WIA was concerned, prior to WARC 1959. Judging the IARU co-ordination role alone the amateur service is unlikely to lose much at WARC 79 by default or inattention to detail. ■

IARU NEWS

PRESENTATIONS

At the 1977 Federal Convention in Melbourne Mr. M. J. Owen VK3KI, one of the four Directors of the IARU Region 3 Association, presented an engraved plaque to Mr. P. D. Williams VK3IZ in recognition of Peter's role in the establishment and early years of the Association. Mr. Owen also presented a very handsome medallion to the Federal President of the WIA from the Philippines Amateur Radio Association (PARA).

In speaking to the Federal Council Mr. Owen, as IARU liaison officer of the WIA, said he would be attending an IARU International Working Group meeting in the UK during June as part of his duties in the IARU. The IWG would be preparing material at different levels for use by IARU Societies in their approaches to their Administration for WARC 79. He referred to problems expected to arise in connection with amateur geostationary satellites for which a technical paper was required, as an example of the upper levels of sophistication.

Amateur radio is now entering the pre-WARC 79 period of increasing activities to detect and define the areas of frequency clashes. The IARU had accepted the role of co-ordinating and assisting societies, especially the smaller societies, towards influencing their Administrations. In the larger countries, WARC 79 work was well advanced and their experience would be valuable in identifying the problem areas. Much work and many difficulties lay ahead, not least being the comparative dearth of accomplished experts in the Region for so vast a project as WARC 79.

Next year, said Mr. Owen, would see the third Region 3 Convention to be held in Bangkok. The WIA would need to consider representation by two delegates for various reasons, particularly relating to WARC 79 the following year. During the year the President of IARU, Noel Eaton VE9CJ, would be embarking on a world tour as a contribution towards societies' work for WARC 79. Various problems with the IARU Region 3 Association's Constitution also required to be tackled. In considering WARC 79 some preliminary assessments were made relating to air fares to Geneva, accommodation expenses and the fact that hotel bookings at so large

LETTERS TO THE EDITOR

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

The Editor,

Dear Sir,

Have just received a copy of February my AR and noted the segment "Notes from IARU" on page 3.

I am afraid that the segment contained an error of fact in it concerning the number of Societies in Region III. The correct figures are —

No. of known Societies within Region III, 17; No. of Region III Societies also members of IARU, 15; No. of Region III Societies members of Region III Association, 12.

The AR item stated that there were only 9 IARU member societies in Region III. This is not correct — there are 15.

The other comments concerning countries having no amateur society are unfortunately correct and it is particularly distressing to note that the following countries in this category are also known to be active in ITU affairs —

Afghanistan, Bangladesh, People's Republic of China, Iran, North Korea, Laos.

There is virtually no amateur radio in any of these countries except Iran and so

it is cause for great concern — which way will these countries vote at WARC 1979 as it seems highly likely that they will have delegates in attendance at Geneva.

David Ranxin 9V1RH/VK3QV,
Secretary IARU, Region 3.

The Editor,
Dear Sir,

May I, through your pages, thank all those many kind Amateurs who have shown such deep sympathy to myself and our family in the loss of my husband, Ron VK3AKC.

It made us very proud that so many people really cared.

To Ron, being an Amateur was not just a hobby — it was a way of life. I don't think anyone else could have got more pleasure out of every phase of it. He appreciated every contact on the air and was even more pleased if he could follow that up with an "eyeball QSO". No one appreciated more than he that the saying "No man is an island", is doubly true in Amateur Radio, and he was always very sincere in his acknowledgement and gratitude for the very many Hams who were always willing to help him in every way they could.

He has often said that, without them, he could not have done the things he has done.

We, his family, thank you, too, for making his Amateur life such a rewarding one for him and we thank you for helping us to bear our very heavy loss.

Mary Wilkinson.

The Editor,
Dear Sir,

NOVICE LICENCE SYLLABUS

What are you trying to do — destroy the Novice course?

This was my first reaction as I started reading page 34 of April AR. For the most part no indication of treatment depth is indicated, although part way through some qualifying notes appear, e.g. "elementary facts only for Novices", as a "judge-man" is difficult to make.

The point I want to make is — let's not get carried away with academics. At the AOPC level we are not trying to train people to become engineers. It is after all only a hobby — albeit a serious one. How much more must this thought apply to the Novice level!

If a prospective Novice operator is confronted with the proposed syllabus I believe there is a good chance he will throw up his arms in despair and then be attracted to the ranks of the CB prates.

Enough said for the preparation of a syllabus and subsequent writing of a course should be tempered by realism with the ultimate objective in view. That objective, of course, is the attainment of a licence.

For the five years ending 1975 I conducted the VK AOPC class under the auspices of the Department of Further Education. I had a break last year, but am back with it again this year. The course runs for two terms, one night per week from 7-9 p.m. (about 26 weeks total), starting just before the August AOPC exam (we are starting a Novice course in May for the November Novice exam).

The students don't complete the course knowing all there is to know about amateur radio, but who does? However, most of them pass at the exam they are satisfied and I am gratified — getting them through is what counts.

The above is not intended to be a criticism of the efforts of others, just a view of things from a different perspective and I trust it will be received as such. Comments were asked for and I am anxious to get licensed amateurs on the air.

M R Barford VK5ZQ

The Editor,
Dear Sir,

Since 1936, some short time contacts have been made for the worked All Continents Award, all without prior arrangement or sheds. First was in 1936 in 50 minutes operating on 14 MHz CW, followed on 6-2-48 in 25 minutes on 14 MHz AM. From here on WAC many times in under the hour, but the best times were in 14 minutes on 22-2-72, 14 MHz SSB, and in 11 minutes on 5-7-73, all 14 MHz SSB.

I have been unable to ascertain from the USA if these times have been bettered, and would like to know if any VK stations have made WAC in a lesser time. Prior to 1964 power was 50 watts input and later 200 was s.

VK4DO

Try and beat this. —Ed.

VHF-UHF AN EXPANDING WORLD

Eric Jamieson, VK5LP
Forreston, 5223

AMATEUR BANDS

VK0	VK0MA, Newson	53.100
VK1	VK1RTA, Canberra	144.475
VK2	VK2WI, Sydney	62.450
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	62.800
	VK4RTT, Mt. Mountbatten	144.400
VK5	VK5DFP, Mt. Loky	63.200
	VK5DFV, Mt. Loky	144.700
VK6	VK6RTV, Perth	62.800
	VK6RTS, Kalgoorlie	62.200
	VK6RTW, Albany	62.500
	VK6RTY, Perth	144.500
VK7	VK7RTN, Launceston	62.400
	VK7RTW, Lonah	144.900
	VK7RTY, Lonah	432.475
VK8	VK8WF, Darwin	62.200
SD	SD3AA, Sava, Fiji	62.500
JA	JO1YAA, Japan	66.110
ML	MLH2W, Seoul, Korea	60.110
K6S	KO6DX, Guem	60.110
KH8	KH8EOI, Hawaii	60.104
ZL1	ZL1VHF, Auckland	145.100
ZL2	ZL2MHF, Upper Hutt	26.170
	ZL2VHF, Palmerston North	62.500
	ZL2VHF, Wellington	145.200
	ZL2VHF, Palmerston North	145.250
ZL3	ZL3VHF, Christchurch	431.800
ZL4	ZL4VHF, Bendigo	145.400

All these plus numerous TV stations located to the north as per the listing last month. Keep a copy by your receiver

SIX METRES

Although 6 metres has been relatively quiet from an Es point of view, quite a bit has been happening via TEP and other modes with stations to the north and north-east. Much of this was observed by Steve VK3GT who was going to write to me with specific details of the various openings, but at time of writing such information has not arrived so it will not be complete. As best I can I have pieced together the following information gleaned from contacts on the air.

On 9/4/77 ten metres was open most of the day, and tests were run between VK3GT and KG6APP in Guem and KH6IAA, the latter having access to the KH6EIQI beacon on 50.110. The 6 metre band opened 0746 to 0829, with KG6APP being worked 5 x 9 at 0746, receiving a SMIRK number 1725. KH6IAA gave 0746-7052Z. An ARI station was noted on 52.050 peaking NNE. 0733-0759 opened to JA with JA to 4-5 x 9. Prior to 11/3 this the KH6EIQI beacon had been copied from time to time between 0612 and 0746. There is a lot more information which I have not got! On 10/4 52° S was noted strong telemetry signals on 52.080 peaking NNE. He

mentioned also there appeared to be little relation on this occasion between the availability of signals on 28 MHz and those on 50 and 52 MHz.

Signals from Japan on 6 metres were available here in VK5 on 9/4 for several hours. I arrived home from a special Saturday job to find the band almost closed but did manage to work JA2FTO, and was called by four others all on the same frequency but did not work any due to the QRM, after which the band closed. I had noted earlier that, before going to work about 1000 local, 28 MHz was fairly lively to Japan, so I was not surprised to hear the band had been open to there.

On 11/4 six metres opened to VK4 from here for about an hour with some very good a/g's, and I worked VK4ALM VK4DO, VK4RO, VK4ZWB, and VK4ZHW (1 watt), as well as Robert VK3AUP on back scatter. Ross VK4RO mentioned JA's had been around since 29/3, and were 5 x 9 on 9/4, but mainly working the northern VK4 area, to VK4AZ, VK4FU Lindsay VK4ALM and Frank VK4FU in Rockhampton had also been hearing the Brisbane beacon (or 2 mears) which was a distance of 300 m's and a bit rare for them.

It would appear from all this that the various continual promptings I give through these columns to keep an eye on six metres at times other than Es periods, is paying off. In addition to the equinoxes there's always the chance of mid-winter DX through June and July. And despite what Steve says about the lack of contact on between 28 and 52 MHz on the occasions he mentions, I am still of the opinion that for many occasions 28 MHz does serve as a good pointer and I am currently looking around for a reasonably good receiver which will give me complete coverage between 30 and 50 MHz so that any time in MUF may be noted.

Still on the six metre scene, I have to hand a letter from Graham VK6ZCJ who writes from Darwin to say the VK6VHF beacon is definitely back on the air on 52.200 MHz, with Trevor VK6ZTW and Brian VK6VY getting it going again. It provides about 25 watts to a ground plane antenna 40' feet high, and located at East Point as before with panoramic sea views from south-west to north-east.

He further reports six metres has been interesting but not outstanding, with a total of six open rigs to JA to mid-April, two in the afternoon about 1600 local, and four in the evenings about 2100 local.

A local commercial beacon L58A operated throughout March on 49.400 MHz. The beacon is involved with TEP investigations and runs about a kilowatt. It is off the air at present but has been around for many years so we would expect it back on in the future some time.

Loca's we watch for a sputa on 49.750 which is the Russian/Chinese channel 11 video frequency. This is a good indicator here of evening band conditions. Signals are also heard on 49.305 (wideband FM — org n. unknown) 53.750 (Hong Kong TV), 53.750 (Malaysian TV sub o.d.). Al. al. these signals have been heard this year as well as TV signals to over 60 MHz.

You are probably aware of the activity of KL7HAM on Shemaya island in the Aleutian Islands. He is a keen six metre man and is looking for JA contacts on the low end of the band. It is possible to work KL7 from Australia, as such signals were heard in 1970 up to this year.

The opening on 12/4 was very widespread with VK1, VK4 and KG6 in on the action. At least three KG6 stations were on the low end of the band with massive JA pile-ups. No signals were heard here. Also DRII area has about eight 6 metre operators but operation is regular. Ten metres is a mix of information for 6 metre activity with almost continual chatter about 6 metres taking place. Of interest was a relay of VK4RD by a JA from 6 metres to 10 metres for the information of VK3AMK on 10/4. This gave us warning of an impending opening to VK5.

On 12/4 the TV on 49.750 built up to fantastic strength. Birdies were to be found to 50.3 wth strength well over S9 effective y blocking the low end of 6 metres. Absolutely no amateur signals were heard and we suppose that it was probably Nanking or China that we heard, being an evening open ng.

Activity in Darwin remains as before, VKBV VK6ZCJ and myself, VK6ZCJ, on 6 metres. VKBV and myself have odd chats on two and activity is

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FEATURES High quality double-sided glass fibre printed board ★ Highly stable zener controlled oscillator stages ★ PIN diode aerial changeover re-ay with less than 0.2 dB through loss ★ Extremely low noise receive converter, typ cal 3 dB ★ Separate receive converter output gives independent receiver facility ★ Built in Automatic RF VOX with override facility ★ Built in 10 watt 144 MHz termination on selectable attenuator for ½ watt ★ Use of the latest state of the art Power Amplifier transistors provide reliable 10 watts continuous output. Limited supply only available ex stock, further units currently on order for expected early delivery.

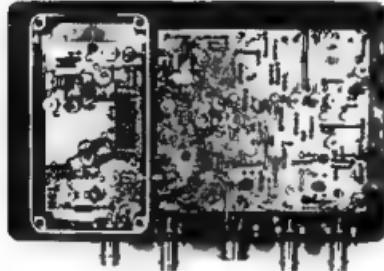
Model MMT432/144 — Price \$260

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Model MMT432 — Price \$215



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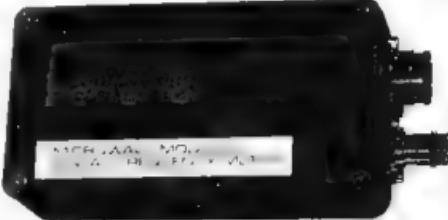
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New Release — 500 MHz COUNTER

This counter has two ranges which are selected by supplying +12 volts to one of two pins on the DIN socket. Internal diode switching brings the input on the 0.45 - 50 MHz range to a 500 MHz oscillator which drives a high speed TTL divider in the main counter logic. On the 50 - 500 MHz range the diodes switch in a high speed ECL prescaler and the decade point is changed according y.

A low angle AT cut quartz crystal is used giving a typical temperature stability of 0.5 ppm per degree C. Provision is made for setting the crystal frequency, and the accuracy of reading is normally better than 100 Hz at 50 MHz, or 2 kHz at 500 MHz.

The counter has built in polarity protection and operates satisfactorily from a nominal 12V DC supply. A suitable 5 pin DIN plug is supplied.

SPECIFICATION

Digit Height	10 mm
Display Width	45 mm
Case size	111 x 60 x 27 mm
Frequency Ranges	0.45 - 50 MHz, 50 - 500 MHz
Sensitivity	Better than 200 mV RMS over 0.45 - 50 MHz. Better than 200 mV RMS over 50 - 500 MHz
Input Connector	50 ohm BNC
Input Impedance	200 ohm approx max
Power Connector	5 pin 270 deg locking DIN socket (supplied with plug)
Power Requirements	11 - 15 volts DC at 300 mA approx max

Model MMD500P — 500 MHz Prescaler, \$65.

Model MMD500/500 — 500 MHz Counter, \$175.

Model MMD500-50 MHz Counter, \$130.

NEW READY-TO-OPERATE MODULES AVAILABLE IN THE SALES PROGRAM OF VHF COMMUNICATIONS

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Overall gain 25 dB Price \$65.

432 MHz CONVERTER

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FET, 100 ohm input, 50 ohm output
in cascode topology
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quite low. Reports of the VK85VF beacon are solicited and QSL's will be provided for reports received. Thanks, Graham, for the news, all this helps us in the south to keep abreast of the northern activity and tends to keep us listening just that more often!

A further letter from the Darwin area, this time from Sue, VK85U, advises that the Darwin Amateur Radio Club Inc. wants it known the VHF calling frequency the Darwin area is Channel 50 FM. It is believed some visitors to the area have not been aware of this. Thanks, Sue.

Tony VK8BV in Karoondie writes as follows. Just a quick note to say I took your advice (ARR April 1977) and turned the beam north and heard JA activity on 16/4 on 50.1 to 60.3. Called on 52.005 and heard a JR2 come back. That was all I copied. Nothing for the next few days. On 16/4 again JA signs on 50 MHz, called same frequency and worked three JA stations. Signals peaked to 5 x 7 for the 15 minute opening, with the JA's running about 20 watts, and I received 5 x 7 plus 10 for 120W PEP. Thanks, Tony, pleased to know you are sharing in the excesses the squelch openings during the equinoxes.

TWO METRES

I cannot report on this band at the moment, although I know there have been some excellent openings across south east Australia. My operating hours for this past few weeks have been rather limited due to "influenza" having two very close friends in hospital diagnosed as having serious cancer infections, one being a terminal illness. Please accept my explanation as being the reason for not passing the news in the usual way, that is, of the air.

ARRL NEWS

I am pleased to report what is probably a world record for an RTTY two-way contact on 432 MHz which occurred on 9/2/77, between Bob VK5PB and Aub VK8XY, with signals to 599 and 10 watts each way. Bob used a 15 element KLM at 92 feet and Aub a 15 element yagi at 27 feet. This information did get to me on a prior date closer to the happening, but don't know where the note got to, but even if mentioned rather late, congratulations are still in order for you two gen's, and we hope the claim for the record does come a fact.

Incidentally, I did have a States visit from Aub VK8XY recently while he was returning from his extended holiday tour from the eastern States. It was pleasing to meet Aub again after a long period, and to learn a bit more about the happenings in Albany.

How many of you are aware of the ARRL list of do's and don'ts for those who use repeaters. I am sure if they were followed out by all the repeaters could become a source of pleasure all over the country.

DO keep all transmissions short. Emergencies don't wait for monologues to finish. If you talk to hear your own voice, what you need is a tape recorder, not an FM rig.

DO think before you transmit. If you can't think of anything worth saying, don't say anything.

DO pause a couple of seconds between exchanges. Sarcasm with a high priority need for the repeater may want to break in.

DO identify properly.

DO be courteous. A repeater is like a telephone party line, and its use requires the same kind of co-operation.

DO use simplex whenever possible. Leave the repeaters for those who need them.

DO use the minimum power necessary to maintain communication.

DO support your local repeater club, even if it does not require all users to be members. Maintaining a good machine is expensive.

DO NOT break into a contact unless you have something to add. Interrupting is no more polite on the air than it is in person.

DO NOT forget that amateur radio is allocated frequencies, because it is a service, not just a hobby. Don't neglect the public service aspects of VHF/FM communication, such as accident reporting, emergency preparedness.

DO NOT try to prove what a great operator you are on the air by criticising the techniques of others. Instead set an example which others will be proud to follow.

DON'T monopolise a repeater. The best repeater users are the ones who do a lot of listening and little transmitting.

DON'T forget that what you say over a repeater can be heard over many square miles by anyone with an inexpensive public service band monitor. These people are potential amateurs, if they like what they hear they may join us. Don't leave them with a bad impression of our hobby by making thoughtless or off-colour remarks.

These are food for thought in the above rules.

Have you given any thought to the suggestion of an HF net for the exchange of information about VHF and UHF activities which was mentioned recently through these columns? You must be all still thinking about it because I have not had a single letter from anyone yet for or against such a VK8XY, while here spoke of the suggestion favourably, so that's one on the list. How about the rest of you saying something?

From the columns of the Gold Coast Radio Club Newsletter is a note from Frank VK4VN warning about TVI. Frank has been hit with this problem for some time and attributes a lot of his problems to the use of transistor distribution amplifiers, a common type which has a gain of 40 dB. This particular type is fitted with two pots for individual gain adjustments on HF and LO bands.

The major source of trouble appears to stem from the detection of strong signals on faulty (high resistance) antenna (TV). A high pass filter is the input to the amplifier circuit in this one every time Frank says the constant K type of filter as sold by an American chain of Radio Shacks is useless for this purpose, and advises anyone with this problem to construct the filter described in the ARRL handbook. Alternatively, you may contact Frank direct for some good first hand information.

MARSHALLINE REINFORCING

From The Propagator comes news of the scheduled tests by VK2AMW on 26/3/77 which

yielded the following results. OZ9CR — called but nothing heard, and the same results with F2TU. The echoes from VK2AMW at that stage were peaking 7 dB over noise. G3LTF contact made with M signal reports both ways. A contact was also made with F9FT who called near the end of the contact with G3LTF. Visitors to the shack during the above tests were Peter Venser and two friends, VK2ALU and VK2ZEN operated.

Lyle advises the following. Should anyone wish to come along to Dapto to see what goes on during moonbounce tests, then if they will give a phone number, on which they may be contacted a day or two prior to the test weekend, to either VK2ALU or VK2ZEN then one of us will phone to advise of the test period.

Monthly tests are scheduled for most stations interested in 432 MHz EME contacts by Gar Mees VE7BBQ who passes on the test schedules via the 432 EME News which is sent each month to all concerned by Allen Katz K2UW. I don't usually get the 432 EME News until a few days prior to the test weekend.

VK2AMW is scheduled on over the period shortly after moonrise at our location for stations in North America and shortly before moonset for stations in Europe, as it is only during these periods that both stations concerned can each see the moon simultaneously. We would be happy to have visitors at any test.

I can recommend a visit to the VK2AMW shack during an EME test if only to observe the amount of work involved, and having been a visitor myself last year, came away with a much better appreciation of the obvious dedication of Lyle and Charlie devote to this project, and they are to be congratulated.

That's about it for now, so will close with the thought for the month. "How often we fail to realise our good fortune in living in a country where happiness is more than lack of tragedy."

73. The Voice in the Hills.

TRY THIS

With the Technical Editors

HOW TO RAISE THAT MAST

T. Laidler VK5TL

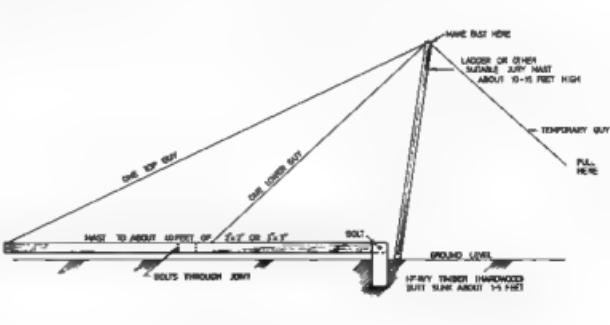
Here is a sure method of raising and lowering a mast without incurring any damage.

The scheme is shown in the sketch. A couple of extra hands holding other guys to stop the assembly swinging on its way up or down are also desirable. Don't let anyone tell you he can hold it without the jury mast. He will be proved wrong and

the mast might break in the attempt. Be warned.

If the "butt" in the ground is a short section of something like an old railway sleeper it will easily take a "U" section cut so that the bottom of the mast can swing in it easily.

An application of chlordane to the butt helps to discourage termites if there are any in the area. I have also used creosote for the same reason but I think chlordane is better.



FERGUSON

DEVELOPMENTS

Once Ferguson made a transformer like this —



It was the Ferguson PF2155 and was an extremely useful and popular transformer.

IN THE INTERESTS OF SAFETY

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Advantages:

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The range of output voltages is, 1.5V, 3V, 4.5V, 6V, 7.5V, 9V, 10.5V, 12V, 13.5V, 15V and 18V.

Additionally centre tapped configurations also available, e.g. 9V-0-9V, 7.5V-0-7.5V, 6V-0-6V, 4.5V-0-4.5V, 3V-0-3V and 1.5V-0-1.5V.

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Let's do some simple arithmetic:

Cat D-3007 Multi-7 Transceiver	\$189.00
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Cat D-4622 Mag. base & lead ext.	\$25.00
Total price: \$236.50	
Plus Dicks 1977 Catalog	(Priceless)
YOU PAY:	\$189.00

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Sydney 21707 Brisbane
41500 Perth 93244

CONTESTS

Kevin Phillips, VK3AUQ
Box 67, East Melbourne, 3002

ROSS HULL VHF/UHF MEMORIAL CONTEST 1976-77 RESULTS

Trophy winner VK4DO, H. L. Hobler.
48 hour certificate VK6ZCJ, G. G. Baker.
Detailed scores—1st Column 7 day, 2nd column 48 hours.

Section (a) Transmitting Open:

VK7MC	2644	1248
3KK	1406	570
3AUQ	1146	
3VF	1138	584

Section (b) Transmitting Phone:

VK4DO	6053	2158
7ZAH	5620	1742
2ZFB	5392	1716
8ZCJ	5243	2064
1ZAR	4963	1538
3ASQ	4815	1412
4ZRF	4702	1382
4ZRO	4321	1312
1RK	4299	1700
5LP	3809	1862
2YDY	3132	1070
6ZBW	2994	1468
2ZCT	2790	1202
4ZSH	2706	890
2BMX	2047	902
6ZKO	1933	1062
3AVJ	1920	890
P29GA	1902	1270
VK2HZ	1506	482
4ZJP	1475	1298
3AUI	1424	836
5ZMM	1141	450
7AK	885	

Section (c) Transmitting CW:

VK4XA	2048	800
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Section (d) Receiving:

No logs received.

CONTEST CALENDAR

June

11/12 RSGB National Field Day
11/13 VK2 VHF Mid-Winter Field Day.
18/19 A1 Asian Phone Contest.
26/28 ARRL Field Day

July

2/3 DL Activity QRP Contest.
2/5 VY Phone
9/10 IARU Red esporti Championship.
8/10 RAST SEANET WW DX-CW Phone Contest.
10-10 Net 800 OSO Party.

August

13/14 *REMEMBRANCE DAY CONTEST.
13/14 European CW Contest.
20/21 RAST SEANET WW DX Phone Contest.
test?
20/21 SART RTTY Contest.
27/28 All Asian CW Contest.

September

10/11 European Phone Contest
17/18 Scandinavian CW Contest.
24/25 Scandinavian Phone

ARIU RADIOPORT CHAMPIONSHIP

July 9/10 UTC. Single and multi-operator, but no multi-transmit (ie. A1 bands 160 to 2 metres, and Oscar stations may be used, but no crossband. Oscar counts as a separate band. Contacts within one's own DX zone count as 1 point, same continent 3 points, 2 outside one's own continent 5 points. My Hifiler is the sum of the number of different ITU zones worked on each band. Exchange signal report and ITU zone. Final score is QSO points times zone multiplier.

OLD TIMER WINS ROSS HULL

VK4DO of Rockhampton, Queensland, was born in that city in 1906, and during a long spell in hospital from a knee injury when he was 14 years old, decided to do something about learning "wireless". Self taught from what he could read, in 1923 he acquired his first licence, A4DO, for 10 watts on 240 metres, and there being only two broadcast stations in Queensland at that time (in Brisbane), he entertained the few local listeners with music and records every Sunday morning. There were no pick-ups in those times. Harold would wind up the old portable gramophone, put on a record and drop the carbon mike down into the sound box. Using absorption loop modulation and 140 volts HT on a 204 valve he was heard in New Zealand. The "B" batteries for the HT became expensive, so a rectifier was made from aluminium and lead in a borax solution, placed in large glass jars. To prevent the evaporation of the solution (and keep the moths out) a layer of kerosene was floated on top and every few days the moths were skinned off.

To improve the RAC note, he next acquired a 500 volt DC generator and with the DC note on CW was the envy of many of the old timers. In those days you could pick a station by the tone of his signal. Always trying to improve his station, he acquired a 210 valve to increase the power to 50 watts input. This tube served for six years and did a mighty job. With 500 volts on the plate if you held the key down too long the plate would get a cherry red from the centre outwards. Before it gave up its life, you could see the grid through a crack burnt through the plate.

In the mid 1920's receiving conditions were good and many times station KGO in Oakland, California, was received direct on 312 metres on a one and two valve set. Acquiring the AOCP in 1925, and being allowed to operate on the 80 metre band, the stage was set for better things. June 1926 saw the accomplishment of two-way QSO's with USA and Hawaii using very

Send logs to IARU Headquarters, Box AAA, New Haven, CT 06511, USA. Awards in the form of certificates will be awarded to the highest scoring CW, phone and mixed code entry from each ITU zone and DXCC country.

RAST SEANET WW DX CONTEST

CW July 8/10, Phone August 20/21 Single band-single operator, multi band-single operator, and multi band-multi operator. 160 to 10 metres may be used. Contact limit is CO SEA for CW and CO SEATEON on Phone. Send RST/RTST report and a serial number starting at 001 and, increasing by 1 for each contact. Contacts between stations in one country will not be counted.

Scoring: SEANET area point counts to one's own SEANET 160 metres 10 points, 80/40 metres 5 points, and 20/15/10 2 points. Contacts between SEANET stations count 160 metres 6 points, 80/40

metres 3 points, and 20/15/10 metres 1 point. Multipliers. For SEANET and outside SEANET areas, 3 points per country, and between SEANET stations, 2 points per country. Final score is the sum of QSO per time the sum of the multipliers.

Use a separate log for each band, and log all items in a GMT. Send logs and a summary sheet to SEANET Contest Committee, Iman Razak, "Esheen" 5M2FK, 281-C Jalan Pekeling, Bukit Glor, Penang, Malaysia. Logs must be received before October 31, 1977.

Restrictions: No crossmode, crossband or mixed CW/Phone logs will be accepted. Only one transmission allowed at any time. Only one contact per band within the same time period.

SEANET area prefixes: AF, AS1, AS, AT, AS, AC3, AP, BV, CR9, DU, EP, EU/HM, HS, AE/AF/JF/JO, JH/JI/JR, JO1, KA, KC6, KG6, KH6, KX6, P28, S21, S79, VK, VQ9, V55, V56, V59K, V59M/SQ5.

HI-MOUNT

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from BAIL ELECTRONIC SERVICES

Model HK-808. Heavy duty commercial hand key with full ball race pivots, heavy marble base and dust cover. The ultimate hand key. Price \$68.00

Model HK-710. Heavy Duty De Luxe Hand Key. Fully adjustable, ball bearing shaft, plastic protective cover. Mounted on heavy non skid poly marble base. Base dimensions 168mm x 103mm. Price \$38.00

Model HK-707. Economy hand key in all black ABS resin, metal parts protected by moulded ABS resin cover. \$19.00

Model HK-708. Similar to HK-707 but without cover and with smart chromium plated keying mechanism and flat American style knob. Price \$15.00

Prices incl. ST/Freight and Ins. extra/Prices and specifications subject to change.



HK-707



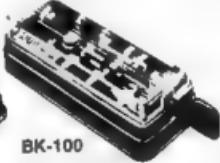
HK-708



TC-701



MK-701



BK-100



ELECTRONIC SERVICES 60 Shannon St., Box Hill North, Vic., 3129 Phone 89 2213
Distributors in Qld., NSW, S.A., W.A.

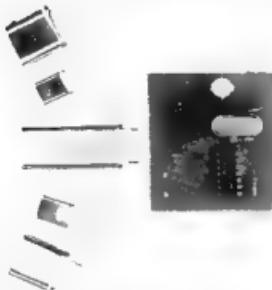
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"WILLIS" AIR-WOUND INDUCTANCES

Take the hard work out of Coil Winding use — "WILLIS" AIR-WOUND INDUCTANCES

No.	Turns			B & W	Price
	Dia	Per Length	Length		
1.08	1/2	8	3	No 3002	\$9c
1.16	1/2	16	3	No. 3003	\$9c
2.08	1/2	8	3	No. 3006	\$1.16
2.16	1/2	16	3	No. 3007	\$1.16
3.08	1/2	8	3	No. 3010	\$1.40
3.16	1/2	16	3	No. 3011	\$1.40
4.08	1	8	3	No. 3014	\$1.56
4.16	1	16	3	No. 3015	\$1.56
5.08	1 1/4	8	4	No. 3018	\$1.75
5.16	1 1/4	16	4	No. 3019	\$1.75
8.10	2	10	4	No. 3907	\$2.52

Special Antenna All-Band Tuner
(equivalent to B & W No. 3907 7 inch)

7" length, 2" dia., 10 TPI Price \$4.36
Reference ARRL Handbook 1981

Willis Pi-Coupler Unit — \$23.95
Stockists of Transmission Cables Insulators and Hard Drawn Copper Antenna Wire
Write for range of Transmission Cables

WILLIAM WILLIS & CO.
Pty. Ltd.
Manufacturers and Importers
77 CANTERBURY RD., CANTERBURY
VIC. 3126 Phone 336-0707

Post Box 69,
Prague 1,
Czechoslovakia.

Requirements

Confirmed contacts are required with at least one station in each of the following areas.

OK1, OK2, OK3, HA, LZ, UA1, UA2, UA3, UAA, UAB, UAG, UA9, UB, UC, UD, UF, UG, UH, UI, UJ, UL, UM, UN, UD, UP, UQ, UR, DM (three different regions), SP (three different districts), YG (three different districts), YU (three different districts) — a total of 39.

GENERAL ALL JAPAN REQUIREMENTS

General

- 1 The award is available to licensed amateurs (WIAJA) and short wave listeners (on a "heard" basis) (HAJA).
- 2 Contacts on and after 30.7.1952 are valid with the exception of OKINAWA (JRW) where contacts on and after 15.5.1972 are valid.
- 3 All contacts must be with land based stations.
- 4 Do not send QSL cards. A list showing full details of the contacts including the location of the station worked, should be certified by the Awards Manager of an IARU Affiliated Society.
- 5 The fee for the award is 10 IRC.
- 6 The address for applications is:
JARL Awards Manager,
Post Box 377,
Tokyo Central,
Japan

Requirements

One confirmed contact is required with each of the 47 Japanese Prefectures.

Prefecture list:

Districts	Prefectures
JA1	Tokyo, Kanagawa, Chiba, Saitama, Ibaraki, Tochigi, Gunma, Yamanashi.
JA2	Shizuoka, Gifu, Aichi, Mie
JA3	Kyoto, Shiga, Nara, Osaka, Wakayama, Hyogo
JA4	Okayama, Shimane, Yamaguchi, Tottori, Hiroshima, Miyagi
JA5	Kagawa, Tokushima, Ehime, Kochi
JA6	Elukou, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, Kagoshima
JA7	Aomori, Iwate, Akita, Yamagata, Miyagi, Fukushima
JA8	Hokkaido
JA9	Toyama, Fukui, Ishikawa
JA0	Niigata, Nagano
JRW	Okinawa

The official countries list for the DXCC is to be published in the 1977 Call Book, which should be available in the next couple of months.

LARA

Ladies Amateur Radio Association

Regular readers of this column may recall that in April we presented an introduction to Radio for the YL, including a glossary of regularly used, but obscure, terms. Several more suggestions have come hand in hand so we present Part II.

ADMINISTRATIVE SECTION

Events

What every amateur has to pass before being let loose on air. These interesting events are held at six month intervals to assess the capabilities of would-be amateurs. Some of us seem to enjoy these cosy convivial events so much that we return time and again. Which brings us to...

RESULTS

Theory has it that these subtle communications are posted to candidates as soon as the exams are marked. In practice, however, the results arrive just as the candidate is wondering whether or not to apply for the next exam six months later.

LICENCE

What the successful exam-sitter acquires eventually and which transforms her or him into a station. What has previously been referred to as a name now becomes a handle and any available space on the roof or on top of the car sprouts an aerial.

TELEGRAPHY SECTION

What the top of a 5% whip on a car hits as you go into a drive-in or petrol station.

But I digress.

HAM GEAR DISCOUNTS

Each month I will bring Amateurs specials from the World leaders including ASTRO, ATLAS, DRAKE, FDK, ICOM, KENWOOD, KYOKUTO, SWAN & YAESU.

Conditions of sale: Prices are applicable for orders received during this calendar month only. Prices and specifications are subject to alteration without notice. All prices quoted are net Melbourne on cash with order basis, sales tax included in all cases. Goods will be sent road freight (comet) or airfreight (freight collect) as directed.

KENWOOD

TS820S AC only, 180-10m with digital display. \$899
TS520 ac/dc model 80-10m, mic not included. \$850
TS700A ac/dc 2m multimode transceiver. \$699
TR7400 fm for 2 metres, digital readout. \$348

Prices effective to June 30th only.

Look at these prices !

WOW!

Mail order only.

J. TAYLOR,
P.O. BOX 50,
KEW VIC 3101.

BLUETOY

Not a name for a callie dog or even a TV series but in fact an official expression of disapproval, dire warning and disciplinary measure. Sent to the evildoer who transgresses the Regulations.

REGULATIONS

Rules and restrictions which govern how, when, what, where and to whom an amateur can transmit a signal.

RETRANSMISSION

Transmitting a signal on air. Not coming up for air as in swimming.

NETS

Regularly arranged exchange of news, gossip, etc. between amateurs. Which brings us to the LARA sash which is held each Monday night on 3650 kHz at 8 p.m. Eastern Standard Time on which all YL operators or YL guests on other stations are welcome. Myrna VK5YVW is our net controller and will welcome newcomers to the net as next week why not come up and join in.

33 LARA

20 YEARS AGO

Ron Fisher, VK3OM

JUNE 1967

Fifty and Over. So begins the Editorial of the June 1967 issue of Amateur Radio. Possibly only a few amateurs today know that the original Limited Licence holders were permitted to operate from 144 MHz up, the five metre band was not available for their use. The June editorial announced that everyone had received notice from the department that five metres was part of the operating spectrum of the Limited Licence. Of course the six metre band was yet to appear on the scene.

Elsewhere in the issue details were printed of the two and five metre bands being carried out by VK5OM at Macquarie Island. Trans Pacific tests were also under way on six metres from California and Hawaii with the VK's able to reply on ten.

An event that attracted amateurs from far and wide was the International Convention in New South Wales. Organised by Craft Retailers VK2O, the event usually scored a write up in *TRA*, right down to a full list of prize winners. Many of the participants are no longer with us but who could forget a character like Dave Evans VK2AYE.

Technical articles in the June 1967 issue of Amateur Radio included part two of Modifying the AR7 Receiver, an Effective Low-Power 144 MHz Transmitter or Exciter by V. Kerr VK4LK. The circuit used a 6AC5, 6B6J, 5762 driving a single 8146 in the final. Frequency converters that is a device separate to the basic receiver and designed to give improved performance on a particular wave as discussed by Tunton. In his article "Approach to Construction" when he came to recording tape, we have come a long way in twenty years. Wonder how many can remember the old paper based tape. No, I don't mean plastic. I notice that Homecrafts were advertising it at three dollars for a 1200 foot spool. From what I remember it worked fairly well. If the brakes on the old Pyrox worked in unison.

PROJECT AUSTRALIS

David Hull, VK3ZDH

JUNE 1977

OSCAR 8		OSCAR 7			
Orbit	Time	Orbit	Time		
Date	Loc	Date	Loc		
1 21155	01.38	85.85	1 11630	00.30	60.99
2 21167	00.38	70.85	2 11843	01.25	74.61
3 21180	01.33	84.60	3 11955	00.24	59.49
4 21192	00.33	69.60	4 11688	01.18	73.11
5 21205	01.28	83.35	5 11880	00.18	57.99
6 21217	30.28	66.35	6 11693	01.12	71.61
7 21230	01.23	82.10	7 11705	00.11	56.49
8 21242	00.22	67.10	8 11718	01.05	70.11

9	21255	01 17	80.85	9	11730	00 05	54.90
10	21267	02 17	65.86	10	11743	00 59	68.81
11	21280	01 12	79.60	11	11756	01 53	82.23
12	21292	01 12	64.60	12	11768	00 53	67.11
13	21305	01 07	78.35	13	11781	01 47	80.73
14	21317	01 07	63.35	14	11793	00 46	65.61
15	21330	01 02	77.10	15	11806	01 46	79.23
16	21342	01 02	62.10	16	11818	00 46	64.11
17	21355	01 07	75.85	17	11831	01 34	77.73
18	21368	01 52	69.80	18	11843	00 33	62.61
19	21380	01 52	74.60	19	11856	01 26	78.23
20	21393	01 47	85.35	20	11868	00 27	61.11
21	21405	00 46	73.35	21	11881	01 21	74.73
22	21418	01 41	87.10	22	11893	00 21	58.81
23	21430	00 41	72.0	23	11906	01 15	73.23
24	21443	01 36	85.85	24	11918	00 14	58.11
25	21455	01 36	70.85	25	11931	01 15	73.79
26	21468	01 31	84.80	26	11943	00 06	88.81
27	21480	00 31	69.50	27	11956	01 02	70.23
28	21493	01 28	83.35	28	11968	00 01	58.11
29	21505	01 28	68.35	29	11981	00 56	68.73
30	21518	01 21	82.10	30	11994	01 50	82.35

JULY 1977

1	21530	00 21	87.20	1	12006	00 50	68.14
2	21543	01 16	80.85	2	12019	01 44	78.76
3	21555	00 16	65.85	3	12031	00 43	64.64
4	21568	01 11	79.70	4	12044	01 38	78.26
5	21580	00 11	64.70	5	12056	00 37	63.14
6	21593	01 06	78.45	6	12068	01 31	76.76

IONOSPHERIC PREDICTIONS

Len Poynter, VK3ZGP/NAC

PREDICTIONS

Solar activity for February and March has been most varied. There have also been some quite spectacular geomagnetic disturbances. Sunspot activity in February was moderate (monthly mean 22.6) whilst March was low (monthly mean 8.0). April looked good with the solar flux reaching 85 then falling back to the low 70's. April produced four quite large geomagnetic disturbances, April 8-9, 16-17, 19-21, 25, quite the largest number in one month over recent times.

There has been some relatively good activity on 26 and 21 MHz together with the other bands. Particular prior to the geomagnetic storms as the MUF rises in one direction and falls quite dramatically in the reverse.

For those interested in the running smoothed sunspot numbers for the period July 1976 to September 1976 here are the latest figures.

7.75-15, 8.75-14.3, 9.75-14.4, 10.75-15.4, 11.75-16.1, 12.75-16.2, 1.75-15.2, 2.75-13.2, 3.75-12.2, 4.75-12.8, 5.75-12.5, 6.75-12.2, 7.75-12.9, 8.75-14.0 9.75-14.2

At Apr 1 1977, the predicted running smooth numbers run 6.77-18, 7.77-19, 8.77-20, 9.77-21. These compare most favourably with NASA predictions made some years ago as 1.77-3, 4.77-15, 7.77-18, 10.77-21

For the symon some figures on average characteristics based on the previous 19 cycles.

Sunspot minimum The new cycle begins with the 12 month running smoothed number between 0 and 11, average 8.5.

Ascending point to maximum value. Values between 2.8 and 6.9 years with 4.1 as the average.

Maximum value. Ranges between 49 and 201 with 109 average.

Descending period maximum to minimum. Values between 4 and 10.2 years with 6.7 as the average.

Period minimum through maximum to minimum Average 10.8 years.

Interval between maximum of two adjacent cycles: Range from 7.3 to 17.1 years with an average of 10.9 years.

9	21605	00 05	63.45	7	12061	00 30	81.64
10	21618	01 00	77.20	8	12084	01 25	75.26
11	21630	00 00	62.20	9	12106	00 24	60.14
12	21643	00 55	75.95	10	12119	01 18	73.76
13	21656	01 55	89.70	11	12131	01 18	58.64
14	21668	00 59	74.70	12	12144	01 12	72.26
15	21681	01 45	88.45	13	12156	00 11	57.14
16	21693	00 45	73.45	14	12169	01 06	70.76

17	21706	01 49	87.20	15	12181	00 05	55.84
18	21718	01 35	85.95	17	12207	01 53	82.88
19	21730	01 30	70.70	18	12219	00 53	67.76
20	21758	00 29	69.78	20	12244	00 46	66.26
21	21781	01 24	63.45	21	12257	01 21	79.85
22	21793	00 24	68.45	22	12270	01 40	74.76
23	21806	01 20	68.20	23	12282	01 34	78.68
24	21818	00 19	67.20	24	12294	00 34	83.28

DX has been scarce during this period although WABSTC/KG5 has been worked frequently in the southern States and VK4ZNC reports working several JA's.

The expedition of ZL2TAX to Antarctica under callsign ZL5TAA was disappointing; Ted is hoping for better results during his next visit in December 1977.

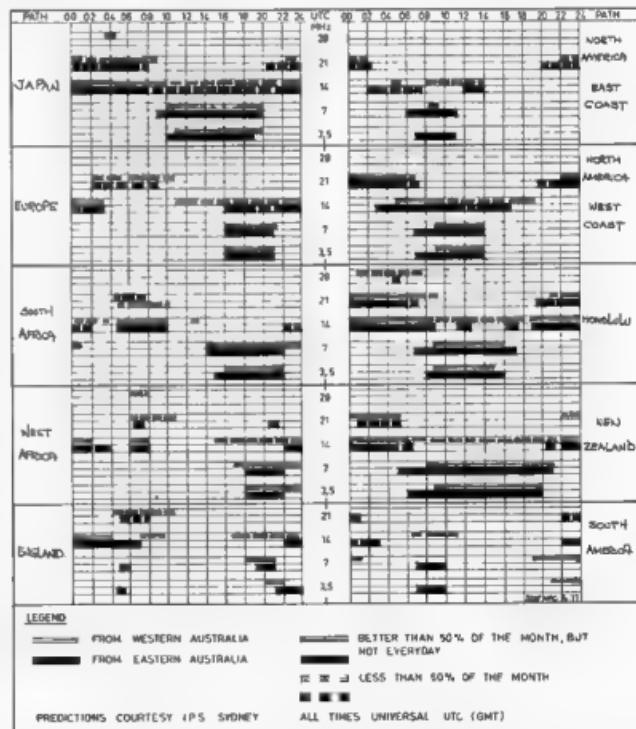
Stewart ZK1AA in Cook Island now has a new transverter for 432 and will be looking for contacts with ZL and VK. It is possible for the Eastern States to work into ZK1, using Ascending Nodes 155-165.

Col VK6ZZQ (ex VK2ZZU) is in Carnarvon and is about the longest VK overland distance from the Eastern States; ascending nodes over 200 give good contacts.

Later report: KC4AA reported on AO7 mode A late April.

REPORT ON OSCAR 7 MODE B

The past three months have seen a number of newcomers to the operations of the 432.15-145.95 MHz repeater of Oscar 7, these include —



Cycle 20 began in October 1976 with a smoothed number 8.5. It rose to a peak of 111 centred on November 1976 at around 12. The anticipated maximum is 1976 with a peak of around 58 or half the average. It is not anticipated to reach a peak

exceeding 100 until 2010, and that's a long way off. It is apparent that 29 and 21 MHz are showing significant improvement over the past six months. With the advent of novice activity on 10 metres, openings previously gone unnoticed are likely to be noticed. Here's hoping.

QSP

CROSS MODULATION

If you've been wondering what effects CB is having on (amateur) radio, wonder no more. The plague of out law SSB CBers may force an end to the manufacture of linear amplifiers, bring point of sale licence checks and FCC approval of all commercial equipment.

73 February 1977

AM AND THE SWL

You know it's a step to think AM is what the SWL listeners like, not SSB. It's astounding to learn how many present day AM stations on 80 and 160 have received letters and phone calls from short wave listeners. No small number of these SWLs become amateurs because, listening to AM is their introduction to amateur radio. Could the proliferation of SSB be a significant factor in the failure to attract newcomers to amateur radio? Don't knock AM

From CG—March 1977

HAMADS

- Eight free to all WIA members, \$1 per 3 cm for non-members
- Copy a typewritten list of 8 block letters to P.O. Box 150, Toolak, Vic 3142
- Commercial advertising is excluded.
- Closing date 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTH means the advertiser's name and address are correct in the current W.A. Radio Amateurs Call Book

FOR SALE

Carpenter relays \$5. Seven power supplies contain transistor 240/450-45 relays, alarm buzzers, diodes, diecast cabinets, etc. \$6 each VK3BBM Ph 1033 232 7084

Close FM/27M 2m FM transceiver var. Full coverage 250W output, with lockable mobo's cradle, manuals. Perfect condition. A nice 12V BA regu' set adjustable computer type power supply. \$310. O.N.O. VK2HS, 23 Brabants Street Bond Junction, NSW 2022 Ph (02) 387 2492

Yasseu FT200 transceiver, exc cond, no mods, 11m xtal fitted black colour handbook and Yasseu AC supply. \$360 O.N.O. Yasseu DC mobile supply \$80, O.N.O. COM C202 B2B transceiver as new, incl handbook \$200, O.N.O. Geosse 222 TA 70W AM/CW 80-10, incl 11m, good cond, \$70, O.N.O. VK2ADP QTH Ph A.H. (0691) 521 3718

Mobile "Swan" MR40A transceiver, 7 MHz, complete with mks and wh p. \$250. Test equipment as new, full var "TMK", \$50. Audio sig gen TECH, TE220 555. Both as new. \$40. VK2CE, QTH Ph (02) 871 7758

Type 6 power supply conv to solid state with separate bias and bias supplies (heavy) \$20. 1677 TCA var band mobile unmodded w/circuit. \$20. 6/40 2m FM trans with PS, 200. DCA audio oscillator 30 push button frequencies. \$10. Iridium 8000p transceiver Tx suitable for 8 m 4/5763. \$8. VK4CY QTH Ph (071) 431465

Brand new Mosley TA233 sensor tri-band beam, all in carbon value \$200. Will part exchange for Mosley TA233 Jun or hi-gain TH303. DX engineering RF speech processor suitable for Drake TR3/4 transceivers. \$80. VK2ASW, 25 Glendannah Hwy Broome 2779 Ph B.H. (02) 720 5164

Hammond H500 10-80 metres with table microphone and manual. \$250 Also Drake 2B RX and manual. \$200 Both in use in shack until recently VK3ACD QTH Ph (058) 21 2484

Robot Show Scan TV, model 70A monitor and mode 80A camera, both as new condition, complete with cable and lens. \$250 each VK5AS, QTH Ph (086) 82 2599 A.H. Cullen 144

2 Pyle 25W 2M FM transceivers, type 8207, 1 unit 6 ch. \$500 other unit 3 ch \$50. Its "type" cells, design available, no X1a supplied. Units complete with 100W 12V DC transistor PSU, cables, mics, and remote cont boxes. 1 STC 190W sing a ch 2m FM transceiver and 240V AC PSU \$60, including cts for ch 40. 1 ex RAAF VHF AM Tx, tunes 100-186 MHz \$15. Contact VK3JANA, QTH Ph (03) 57 3807

Mobile Helical Whips, 66 m solid fibreglass, ½ in taper to 50 ohm, 3/8 in 2d slot screw tip. Well proven, high efficiency. 80m, 40m, 20m bands, \$15 each VK3QJ. Ph (03) 818 8242

National HRO RX rack mtg model coils cover 500 kHz to 30 MHz, band spread 40-20-10. Original and ex condition. Per supply, spkr manual and spare valves and \$150. VK3QJ Ph (03) 818 8749

FT220 2m Transceiver, AC and DC operation on FM, CW and SSB, no mods. \$400. Also Yasseu FT2FB 2m FM module, 7 transistors and 5 simple channels fitted, \$150. VK3AXU QTH Ph (03) 336 1054

FT211, brand new \$580. FT200 unmarked, extra PA, valves, AC supply, \$320. Barlow Wadley first class, \$250. VK2H1 QTH Ph (02) 78 4257

Drake R6 Communications Rx, excellent condition, matching speaker, 1 kHz reader over 16 500 kHz bands, ideal ex FVO match filter, manual, \$500. O.N.O. 800 Shure VK3SY74, 27166 Drayton Rd. Tonawanda 45264 Ph (075) 30 1300, ext 63 (work).

Forest Phone 169W all transceiver transceiver, converted to 1825 kHz. \$95. McLeod 12W valve type transceiver, converted to 1825 kHz, no power supply. \$40. VK2BPX QTH Ph (02) 44 5549

"AR" 1959 to 1966 inclusive plus 50 odd copies "Electronics Australia", 1960 to 1973 inclusive, 7 copies short. "Practical Wireless" 1966, May to September 1967, July to November 1968, April to August "Break In", 1970 to 1974, few short others. To Maurice Batt, R.S.D. Rokewood Junction Victoria 3351

Star 8K700 amateur Rx covers 10 thru 80m plus 2m and 70cm, complete with manual and ext speaker or 10W, or 100W for TH3R or similar beam. VK2JP Ph (060) 25 4580

Yasseu FT221, as new, excellent condition, complete with mks and cables, original packing and handbook \$525 O.N.O. KEN KP2002 as new with matching chaser, built in 100W 12V 100W 24V switchable with BNC connector, xtal for channel's 40 and 50 repeaters 2, 3, 4, 6, \$150. O.N.O. Joe, VK3YBP, Ph (03) 528 4545

Reader Test Set, built IFF 500's AN/ARH-6, etc, complete with manual as new. \$175. O.N.O. Mefit TV wobbulator with 3233 TRIO 945000, R.F. CW in converter, \$175 O.N.O. J. Preddy, 57 Bayview Ave., Earlwood 2206 Ph 55 5436

National Panasonic FM-AM 5-band AC-DC portable radio model RF 1150 Bk incorporating many features. Includes BFO and provision for external crystal, 20-200 kHz, 1000 mHz. Transistor, variable, state-of-the-art. FT558, #6874 4 and #6974 5. Never been used as not suitable for novice frequency. One High-gain 14 AWG antenna. \$50 or near offer as new antenna is sought. VK4NAX, 18 Trentham St., Toorloola Estate Gladstone Queensland 4680

Precision picture monitor, Astor VM14P CW, handbook spare tubes, parts good condition. \$250. TCA R5223 communications Rx, not working but repairable. \$100. Leader LS611 signal generator FET used not working. \$10. RTTY detector, AWA LS52740, working. \$30. Much other stuff. R Brougham VK3AEJ, 64 Armadale St., Armadale 2000

Hayes 6A8000 Rx, 80m to 6m amateur bands, only, AC or 12V DC, 100 per cent electrically and mechanically compatible with 16 18 20 22 24 30. Also 2 x 813. 2 x 811, plus 2 x 6300 much too hungry on 12V DC! What offers? VK4ZB1 QTH Ph (03) 57 3807

Laylaser 8A8000 Rx, 80m to 6m amateur bands, only, AC or 12V DC, 100 per cent electrically and mechanically compatible with 16 18 20 22 24 30. Also 2 x 813. 2 x 811, plus 2 x 6300 much too hungry on 12V DC! What offers? VK4ZB1 QTH Ph (03) 57 3807

2 only 7360 or 6486 valves. Price to VK2ZB1, QTH Ph (03) 57 3807

"AR" 1974 March, May and November, 1975 January to October. "Practical Wireless" June 1973. Please quote prices Maurice Batt, R.S.D. Rokewood Junction, Victoria 3351

16AVT or 14 type vertical antenna tuning unit SWR doble meter VK2OB QTH Ph (03) 527 4545

12V DC power supply for Galaxy III. Please quote price wanted. VK3YBP QTH Ph (03) 82 2754

Capacitor, low KV rating, as many as possible. For reconstruction Testa VK3XTK, "Sonoma", Wellington Rd. Narrabeen East 3804

Johnson matchbox or Milen transmatch. Price and particulars to J. Hawker, Box 27, Portland 3015.

SILENT KEYS

It is with deep regret that we record the passing of—

Mr. W. J. ERICH W5AL ex 3D2EK

Mr. I. L. BROWN VK2RY

Mr. LAURIE KELSELL VK2AKV

Mr. C. A. CULLINAN VK3AXU ex A3XW, DA3XW, VK7XW

Mr. A. ROBERTS VK2TZ

Mr. S. ADAMS VK3UE

IVAN LESLIE BROWN VK2RY

Amateurs everywhere were saddened by the passing of Ivan on the 8th April, 1977.

A true CW man from 1938, when he gained his AOCP Ivan put these talents to work in WW2 when, as a member of the First Australian Discrimination Unit, he was largely instrumental in tracking down subversive radio influence in VK, and elsewhere.

He rose from Telegram boy to Traffic Officer in the PMG, retiring in 1967 through heart trouble. For the last couple of years he battled leukemia, but never complained of his problems.

A founder of the CW Net, his immediate Morse and cheerful personality will be sadly missed by those privileged to know him.

VK2BM

STOLEN EQUIPMENT

Stolen from car parked at Lakeside Hole Camberra Easter 1977 one Icom IC22A 2m FM transceiver, serial 3371 Reported to Camberra police Any news of this transceiver please advise VK3LC VK3RTH

Swan 350 Icvr w/ 10 mc. serial C458457 Swan 17 XC AC PSJ serial 1093. Mult 7 2m Icvr mult and 12 vols serial 65123 Leader 8g per LSG-11 SWR meter 100 microA movement in grey-painted all case. Any news of these VK2AM1 QTH Ph (02) 871 5176

Shack in North Bondi was burgled during the night and the following item stolen

Yasseu Muus FT22R, serial number 8-29-1700

It would be appreciated if anyone with information relating to this equipment, or being offered the equipment for sale, should please contact Box Hill C1B (03) 88 9466, or if inconvenient call QTH on (03) 85 4748 or (03) 20 2411 (bus hrs) Ken Constable VK3PN.

AROUND THE TRADE

SCALAR INDUSTRIES PTY LTD NEW SCALAR COMPANY

Scalar Industries Pty Ltd. Mebourne based communication engineers and C D Townsend (Eng) Pty Ltd sheet metal eng'rs of Sydney have formed a jointly owned all-Alpha air company Scalar RFI Pty Ltd.

The new company is to offer a special air radio frequency engineering facility to Government departments and the electronics industry generally. The new company is in a position to execute the largest RFI shielding jobs where necessary.

Scalar RFI Pty Ltd. have a new factory at 60 Barry Street, Bayswater Victoria 3104. Tel 762 6582 and will also manufacture in Sydney.

Scalar Industries Pty Ltd will now concentrate on manufacturing and supplying the rapidly expanding communication on an areas market in Australia with particular emphasis on development of new products not previously available from Australian manufacturers.

Scalar Distributors Pty Ltd will continue to expand its activities in the importation and marketing of electronic instruments and devices but with particular emphasis on communication antenna products and instrumentation.

ELECTRONIC ENTHUSIASTS EMPORIUM

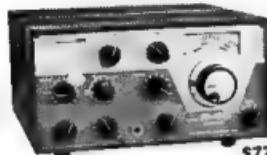
POPULAR INTEGRATED CIRCUITS IN STOCK

CA3012	4.80	CD4026	3.30	CC4724	3.85	LM380N	2.75	MC1496K	2.75	UAA180	3.25
CA3013	5.80	CD4027	1.05	CD40097	1.80	LM381N	3.20	MC1590G	8.75	UAA723C	LM723
CA3018	3.55	CD4028	1.80	CD40174	2.20	LM382N	2.80	MC1450	12.00	UAA724	3.80
CA3020	6.00	CD4029	2.20	CD40174	2.20	LM383N	2.80	MC4048P	4.90	UAA2208	2.45
CA3028A	2.60	CD4030	.95	CD40192	2.90	LM3855CN	1.20	MC4048	6.90	UAA2209	2.45
CA3035	5.20	CD4031	4.70	CD40194	2.90	LM6555CN	1.85	SAJ110	2.50	ULN2111	2.10
CA3039	2.10	CD4033	2.35	CD40196	2.90	LM7100CN	2.00	74C00	.55		
CA3040	2.00	CD4041	2.20	CD40198	2.90	LM7101CN	2.00	74C02	.50		
CA3053	1.70	CD4041	2.50	CD40199	2.90	LM7102CN	2.00	74C04	.50		
CA3059	8.40	CD4042	1.95	CD40201	1.90	LM5652N	10.80	SD3060E	1.30	74C04	.50
CA3062	8.40	CD4043	2.25	CD40201	1.90	LM566CN	3.50	SD3060E	1.50	74C10	.65
CA3079	4.40	CD4044	2.25	LM1149	4.90	LM567CN	2.50	74C14	2.80		
CA3090	2.10	CD4045	3.20	LM1150	5.15	LM568CN	2.50	SD425A	1.80	74C20	.75
CA3081	2.70	CD4046	4.00	LM301CN	5.95	LM7103CN	1.25	SD425D	3.00	74C20	3.00
CA3082	2.70	CD4047	1.95	LM304H	3.80	LM7104CN	1.25	SL440	1.90	74C86	.50
CA3083	2.93	CD4048	.95	LM305A	3.80	LM7105CN	1.25	SL442	2.80	74C99	.50
CA3086	LM3086	CD4050	.90	LM307H	2.00	LM723H	1.70	SL447	1.50	74C154	.50
CA3087	CD4051	.95	LM307H	2.00	LM723M	1.25	SL449	1.60	74C180	3.60	
CA3090	6.80	CD4052	2.25	LM309K	2.60	LM723CN	2.70	SL450	2.50	74C180	4.00
CA3091	1.80	CD4053	2.25	LM310N	3.90	LM733N	2.50	SL613C	7.25	74C174	2.50
CA3120E	4.50	CD4065	1.45	LM311A	3.50	LM741CH	1.20	SL620C	9.50	74C192	2.80
CA3137E	4.50	CD4066	.55	LM311H	3.60	LM741CN	7.5	SL621C	9.50	74C205	16.70
CA3138E	4.50	CD4067	.95	LM312H	3.50	LM742CN	1.20	SL622C	10.00	74C205	2.20
CA3130T	2.25	CD4070	.55	LM312K	5.90	LM747CN	2.50	SL622C	26.90	MI8C	
CA3140T	2.25	CD4071	.55	LM316A	5.90	LM748CN	1.20	SL624C	8.80	AL5352	
CA3500	3.30	CD4072	.55	LM319H	2.75	LM303N	2.60	SL630C	8.80	GL4484	1.80
CA4020	5.85	CD4073	.55	LM320N	5.90	LM312D	3.50	SL630C	10.80	GL5233	.90
CA4021	5.85	CD4074	.55	LM320N	6.00	LM312D	3.50	SL630C	12.00	GL5233	.90
CA4022	5.85	CD4075	.55	LM320T	4.50	LM1488N	6.90	SL645C	12.60	RL4484	.30
CD4005	2.30	CD4081	.55	LM322N	4.50	LM1489N	5.75	SL901B	3.90	RL5023	.35
CD4007	.55	CD4082	.55	LM323K	4.50	LM1490N	1.90	SL917B	6.50	FN0307	3.50
CD4009	2.35	CD4083	.55	LM324N	4.50	LM1491N	3.90	SL917B	8.00	FN0309	3.50
CD4009	1.50	CD4084	.55	LM325N	4.50	LM1492N	3.90	SL917B	9.50	FN0309	3.50
CD4013	1.80	CD4085	.55	LM326H	4.50	LM1493N	3.90	SL918B	1.20	SL630B	
CD4011	.55	CD4086	.55	LM326H	4.50	LM1494N	3.90	SL918B	1.20	SL630B	
CD4012	.55	CD4087	.55	LM327N	4.50	LM1495N	3.90	SL918B	1.20	SL630B	
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CD4015	.55	CD4089	.55	LM327N	4.50	LM1497N	3.90	SL918B	1.20	SL630B	
CD4016	.55	CD4090	.55	LM327N	4.50	LM1498N	3.90	SL918B	1.20	SL630B	
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CD4042	.55	CD4114	.55	LM327N	4.50	LM1522N	3.90	SL918B	1.20	SL630B	
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CD4083	.55	CD4155	.55	LM327N	4.50	LM1563N	3.90	SL918B	1.20	SL630B	
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CD4085	.55	CD4157	.55	LM327N	4.50	LM1565N	3.90	SL918B	1.20	SL630B	
CD4086	.55	CD4158	.55	LM327N	4.50	LM1566N	3.90	SL918B	1.20	SL	



DRAKE

C-Line Amateur Equipment



\$775

Drake R-4C

Solid State Linear permeability-tuned VFO with 1 kHz dial divisions. Gear driven dual circular dials. High mechanical, electrical and temperature stability.

Covers ham bands with crystals furnished. Covers all of 80, 40, 20 and 15 meters, and 28.5-29.0 MHz of 10 meters.

Covers 160 meters with accessory crystal. In addition to the ham bands, tunes any fifteen 500 kHz ranges between 1.5 and 30 MHz, 5.0 to 6.0 MHz not recommended. Can be used for MARS, WWV, CB, Marine and Shortwave broadcasts.

Superior selectivity. 2.4 kHz 8-pole filter provided in a-sat positions. 8.0 kHz 8-pole selectivity available. Optional 8-pole filter of .25, 5, 1.5 and 5.0 kHz bandwidths available.

Tunable notch filter attenuates carriers within passband.

Smooth and precise passband tuning.

Transceive capability, may be used to transceive with the T-4X, T-4XB or T-4XC Transmitters. Illuminated dia. shows which PTO is in use.

Usb, lab, a-m and cw on all bands.

Avg with fast attack and two release times for a-sat and a-m or fast release for break-in cw. Avg also may be switched off.

New high efficiency accessory noise blanker that operates in all modes.

Crystal lattice filter in first I-f prevents cross-modulation and desensitization due to strong adjacent channel signals.

Excellent overload and intermodulation characteristics.

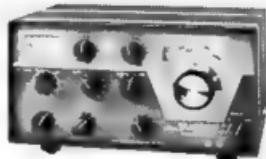
25 kHz Calibrator permits working closer to band edges and segments.

Scratch resistant epoxy paint finish.



Drake MS-4

Drake MS-4 Matching Speaker for use with R-4, R-4A, R-4B and R-4C Receivers. (Has space to house AC-3 and AC-4 Power Supplies).



\$685

Drake T-4XC

Solid State Linear permeability-tuned VFO with 1 kHz dial divisions. Gear driven dual circular dials. High mechanical, electrical and temperature stability.

Covers ham bands with crystals furnished. Covers all of 80, 40, 20 and 15 meters, and 28.5-29.0 MHz of 10 meters.

Covers 160 meters with accessory crystal. Four 500 kHz ranges in addition to the ham bands plus one fixed-frequency range can be switched selected from the front panel.

Two 8-pole crystal lattice filters for sideband.

Transceives with the R-4, R-4A, R-4B, R-4C and SPR-4 Receivers. Switch on the T-4XC selects frequency control by receiver or transmitter PTO or independently illuminated dial shows which PTO is in use.

Usb, lab, a-m and cw on all bands.

Controlled-carrier modulation for a-m is compatible with sub linear amplifiers.

Automatic transmit-receive switching. Separate VOX time-delay adjustments for phone and cw. VOX gain is independent of microphone gain.

Choice of VOX or PTT. VOX can be disabled by front panel switch.

Adjustable pi network output.

Transmitting avg prevents flat-topping. Meter reads relative output or plate current with switch on load control.

Build-in cw sidetone.

Spotting function for easy zero-beating.

Easily adaptable to RTTY, either fsk or afsk.

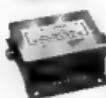
Compact size, rugged construction. Scratch resistant epoxy paint finish.

High Pass Filters for TV Sets

provide more than 40 dB attenuation at 52 MHz and lower. Protect the TV set from amateur transmitters 6-160 meters.



Drake TV-300-HP
For 300 ohm
twin lead \$13

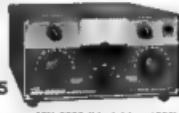


Drake TV-75-HP
For 75 ohm TV coaxial
cable, TV type
connectors installed \$17

Write, 'phone or call for technical information



\$135



\$265

MN-2000 (Model No. 1509)

Drake MN-4 & MN-2000 Matching Networks

* Integral Wattmeter reads forward power in watts and VSWR directly can be calibrated to read reflected power. * Matches 50 ohm transmitter output to coax antenna feed line with VSWR of at least 5:1. * Covers ham bands 80 thru 10 meters. * Switches in or out with front panel switch. Size: 5 1/2" x 10 1/2" x 8 1/2". * 20 dB of attenuation. * MN-4 200 watts, MN-2000, 1000 watts (2000 watts PEP). * MN-2000 only. Up to 3 antenna connectors as selected by front panel switch.

TVI Filters

Low Pass Filters for Transmitters

have four pi sections for sharp cut off below channel 2, and to attenuate transer harmonics falling in any TV channel and fm band. 52 ohm SO-239 connectors built in.

Drake TV-3300-LP

1000 watts max. below 30 MHz. Attenuator better than 80 dB above 41 MHz. Helps TV-I interference, as well as TV front-end problems. \$32

Drake TV-5200-LP

200 watts to 52 MHz. Ideal for aix meters. For operation below six meters, use TV-3300-LP or TV-42-LP. \$32

Drake TV-42-LP

84 four section filter designed with 43.2 MHz center frequency. Provides high attenuation in all TV channels for transmitters operating at 30 MHz and lower. Rated 100 watts input. \$19

Prices shown include Tax

P O Box 30 Concord N S W 2137
Telephone 736-2888
Melbourne 233-4044 Adelaide 42 6666
Brisbane 36 5061
Perth 25-3144, Wellington N Z 69 7566

ELMEASCO

Instruments Pty. Ltd.



THE W.A. BULLETIN

WEST AUSTRALIAN SUPPLEMENT TO "AMATEUR RADIO"

JUNE 1977

PATRON: His Excellency the Governor
 Air Chief Marshal

Sir Wallace Kyle, G.C.B., C.B.E., D.S.O., D.F.C., K. St. John J

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 P.O. Box N1002
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DIVISIONAL NEWS BROADCAST VK6WI
 News material assembled and broadcast originated by
 Glen Ogg VK6KY
 SUNDAY 0130 Hours G.M.T.
 80 Metres SSB 3600 KHz.
 40 Metres SSB 7080 KHz.
 20 Metres SSB 14100 KHz. 14175 KHz.
 11 Metres 27125 KHz.
 6 Metres FM 52.656 MHz.
 2 Metres FM via Channel 2 Repeater

GENERAL MEETING Held on the THIRD TUESDAY of each month at 1945 Hrs at SCIENCE HOUSE, 10 Hooper St., West Perth

COUNCIL MEETING Held at the QTH of the Secretary, 388 Huntriss Rd. Woodlands, on the LAST TUESDAY of each month at 1930 hours.
 OBSERVERS WELCOME

MEET THE RESIDENT - ROSS GREENAWAY - VK6DA - Age 50

Ross obtained his callsign in 1962 and since then has been a very active member of the W.I.A. (W.A. Division). He has been heard working on all bands and his merry manner has made him a great favourite amongst Amateurs far and wide.

In his early years Ross manufactured most of his equipment and even now is always active in the construction of various projects for use in and around the shack.

Ross was Editor of this Bulletin for many years and it feels very strange to be writing these articles without his able assistance. He has also acted in the position of W.I.C.E.N. Co-ordinator, Minute Secretary and Vice President. all of these were handled in his usual quiet efficient manner to the benefit of all members of this Division.

At the moment Ross operates an FT200 on the H.F. bands using a TH3 Junior Beam. A Multi 7 in his mobile shack for 2 Meters and a converted Vinton for 6 metres (We hear that he has another 6 metre unit on the workbench)

His XYL June has always been a great asset to him and has always been around to help him in his many activities specially around R.D. Contest time when she spends those weary hours writing up the log and keeping Ross going . Ross and June have three harmonics, Dianne, Allison and David. They are also the very proud grandparents of Leanne and Narelle.

Congratulations Ross on being elected President of the W.A. Division and the best wishes from all members of the Division

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ANNUAL REPORT

By A. M. AUSTIN VK6MA

Gentlemen

This Division of the Institute has enjoyed a relatively successful year. By careful management our Treasurer has kept our finances in a healthy state, he has been most active in the trading of books and other items to our mutual benefit. This has enabled us to continue without an increase in subscription rates.

The Membership Secretary has been busy ensuring a steady stream of new members and again our Programme Organiser has done his best to provide a varied and interesting year. I thank too, the Bulletin Editors and the Broadcast Officers for their services to our country members.

This year has seen our state take a step forward with the appointment of His Excellency the Governor, Sir Wallace Kyle, as our Vice Royal Patron. We have seen the beginning of long overdue changes to our constitution which I hope will be an ongoing process. The changes concerning auditing have saved our Division a considerable sum of money and I thank our Auditors for this year who undertook the task at such short notice. Again peaceful and useful relations were enjoyed with the Australian Telecommunication Commission which resulted in some constructive planning by the repeater users to continue to develop a rationalised system for the operation of the facilities now available.

I feel that the way is now open for an active President to lead us into 1978 and better and bigger things. We now have the Novice Liscencce members to cater for and the possibility of havin

to learn to co-exist with legal C.B. operators.

Finally I thank all my other fellow officers and you, the Members, for the confidence you have shown and the co-operation I have received in this my third term as President

A. M. Austrin (VK6Ma)
Divisional President

LETTER TO THE TREASURER

Dear Mr. Kitchens,

I refer to your article in the current issue of the Bulletin, in which you request some "feedback" from members on your comments and points of interest you have raised therein. Which I think are very good and warrant some comment. Consequently, I tender herewith my humble opinion and suggestions in respect to the subjects you have raised.

FINANCIAL RESERVE Your advise that a sizeable sum of reserve cash has been invested with the Town and Country Building Society speaks very highly of the general management of the Institutes affairs. My opinion is that the Institute should accumulate a large financial reserve, at this stage, Money is Power, and after all "Diamonds are still a Girl's Best Friend". With the uncertain conditions prevailing at present it is best to have cash in hand, which is an asset, rather than say Real Estate which could be a liability. SLOGAN - Build up the Bullion, this will be very handy later when the time comes.

SUBSCRIPTION RATES The present rate of Subscription Rate is fair enough and should not be changed. No one could convince me a Full Member cannot find about 38 cents a week to support his Institute. This amount would not provide him a packet of cigarettes or a Bus ride to the City or a beer with his mate after work, but he can find this readily enough. Anomalous will exist, Utopia does not exist.

BUYING INTO A BUSINESS This is nothing short of the conception of a mental derelict, an excellent way of throwing away good money. I cannot imagine a long line of VK6's, their pockets bulging with folding money waiting to purchase capitol equipment from the Institute Shop at a discount. No. This I cannot imagine. It is more likely to be the casual buyer wanting a 3 mm plug or some such trivial piece of apparatus. The Wireless Institute is a technical body devoted to a particular phase of the science; keep it as such. It is not a trading organisation, and was never intended to be.

ASSOCIATED MEMBERS AND Z CALLS If the Institute is prepared to accept these Groups as members, and collect from them a subscription for the privilege, then it should also be prepared to give them the opportunity to express their views in Council, as related to their particular field of interest. I think your suggestion that they may have a seat on Council for this purpose is a good one. It could do no harm and certainly would make the parties feel the Institute was taking more than a casual interest in them.

C.B.ers This is a different story. These people at the present are an unlicensed and illegal body. The Wireless Institute could not afford to associate itself with such a body, on an official basis, such as a seat on the Council. Take an interest in them. Yes. By all means. There is a limited number of potential

members here. As you say the A.R.R.L. is doing just this. I would venture to say the C.B.ers are here to stay, irrespective of the present position. There will be of course the usual Political stalling, sort of showing the flag, so to speak. But in time a regulation will be drafted to accommodate them in a prescribed band and they will become officially recognised.

Kindest regards

M.J. Murray VK6MY

P.S. By the way Mr. Kitchens see that you collect your wages from Mr. Ed.

BUMPER STICKER COMPETITION

Good prizes are offered for a suitable Bumper Sticker to go on your mobile shack.

Something suitable to fit 12" x 2"

Surely someone can think up something suitable that advertises Amateur Radio in a suitable way.

Get your entries in as soon as possible to our new Public Relations Officer

LOCAL CONTESTS

Years ago, in the dim dark past, there used to be many local contests that gave everyone a great amount of enjoyment.

This was discussed at a recent Council meeting but they failed to come up with any new ideas. Have you got a suggestion????

If so. Don't keep it to yourself. Let the Council know about it and we will see if we cannot revive some interest in these fun and games local contests.

AMATEUR OF THE YEAR AWARD

This Award will be made at the Christmas Party and we would like to have your nomination for the member who you feel should receive it for his efforts during this year of 1977.

Lets us have those nominations in early so that they can get the consideration due to them.

DISPLAY OF AMATEUR RADIO EQUIPMENT AT KARRINYUP SHOPPING CENTRE

Our P.R. Man Barry has arranged for a display of Amateur Radio equipment etc. at the Karrinyup Shopping Centre in July. If you have any suggestions then please contact Barry and let him know.

This is another first for the Division for a long time so let us all pull together and make it a really good show, it is on the cards that it could be the first of a series that will assist in improving our image in the eyes of the general public.

THANKS ---- THANKS ---- THANKS

Our sincere thanks to all those members who donated towards the prizes for the Raffle at the April Meeting. This helped our funds to the tune of \$20.00.

"Every little bit helps" the Old Lady said.

THE USE OF ELECTRONICS IN THE PERTH
METROPOLITAN WATER BOARD

Alarm signalling, communication and electronics play an important role in the daily operations of the Perth Metropolitan Water Board. The provision of water, sewerage and main drainage in the Perth and Metropolitan area for a population of over 600,000 requires expert technical support using the latest techniques and equipment.

ALARM SYSTEMS: Much of the Board's equipment is unattended so that early warning of faults is essential to reduce the chance of damage and to allow repairs as soon as possible. The two alarm systems employed are; -

1. D.LTEC'S LOW SPEED TELEMETRY ALARM SIGNAL

The functions of these systems, located at Kwinana, Woodman's Pt., Pt. Peron, and Beenyup Waste Water Treatment Plants, is to monitor the failure of equipment located at a remote site. Up to thirty points at the remote site may be monitored and this information is relayed to a central monitoring station. A single pair of Telecom Australia lines is used to carry the fault information. The system provides equipment for display of faults in the form of lights on a panel located at the remote station and at the central monitoring station.

The mode of transmission is digital, as is explained below. At the remote station, a 5 bit word is formed and transmitted serially, for each position being scanned, in a 5 bit shift register. A clock module produces a 150 Hz square wave which sets the bit rate at 75 baud. This is converted on a transmitter Board to frequency shift keyed (FSK) tones which are subsequently passed on to the Telecom private line. At the central monitoring station, this signal is decoded and any alarms that are present are displayed on the alarm panel, and the presence of any alarm causes the sounding of a common alarm hooter.

2. CONCENTRATOR ALARMS

Most of the Board's 384 pumping stations and 69 reservoirs, summit tanks and water towers and all of the 12 waste water treatment plants and 3 water treatment plants are fitted with fault alarms. Telecom Australia private lines are used to signal the control centre when a fault occurs.

For example, at a sewerage pumping station, when a high sewerage level fault occurs, the level of liquid reaches the Flygt Ball regulator which in turn will tilt, and the mercury switch inside the unit will close the circuit to actuate the alarm. The alarm will be registered on a common alarm panel at the Leederville Control Centre, where the officer in charge will alert the relevant personnel of the fault.

TWO WAY RADIOS - SELECTIVE TONE CALL.

Because of the large area of responsibility and the requirement for rapid communication the Board has developed a vast two way radio network. Approximately 400 of the Board's 712 vehicles are fitted with two way radios, of which 200 are fitted with selective tone calling. Selective tone calling allows the Base Station Control Operator to call any mobile vehicle individually.

Each mobile is fitted with an address decoder which responds only to transmissions commencing with the appropriate two tone code for that mobile. A "Call" lamp lights on receipt of a call in combination with a buzzer or an audible alarm, which automatically alerts the mobile operator. The Control Station is fitted with an addressee encoder to enable the operator to select any vehicle individually. Selective tone calling saves time by eliminating voice preamble and avoids doubt in difficult operating conditions by its positive indication of the person required.

EFFECT OF ELECTRONICS ON MWB OPERATIONS

There has been a profound effect on the Instrumentation Section of the Board over the last 5 years. From being predominantly pneumatic, the instrumentation is now mainly electronic, and it is noticeable that there is a proportionately larger amount of instrumentation appearing in the Board's installations, such as dams, reservoirs, waste water, and water treatment plants.

A common form of instrumentation is for the measurement of liquid flow and pressure by the use of magnetic flow meters and electronic pressure transmitters. At dam sites the chlorination and fluoridation equipment is part of a control loop with a magnetic flow meter, to correctly dose the outlet water. Waste water and water treatment plants employ a variety of control schemes, using standard industrial process control systems, to direct the operation of various plant components.

TELEMETRY

The use of Telemetry is increasing rapidly for the control of pumps and valves at remote sites and to transmit back to the Leederville Control Centre, relevant pressures, flows and equipment status indications. The Board's Telemetry systems are a mixture of Frequency Division and Time Division Pulse Code Modulation (PCM) multiplexed systems.

WATER LEVEL CONTROL IN HIGH LEVEL WATER TANKS

The Fielden Electronic Level Control units operate in conjunction with a sensing probe, or electrodes, which are mounted in a water tank. The change in electrical capacity produced by water when it surrounds the probe is detected at the Fielden unit. This change is amplified by a sensitive and stable transistorised circuit, which provides positive operation of a heavy duty relay. This relay directly controls the operation of the electric motor driven pumps which in turn control the level of water in the tank.

VARIABLE SPEED CONTROL OF D.C. MOTORS

Solid state control of d.c. motors using Siemens Simoreg thyristor units, is expected to be used in the near future.

TESTING THE INSULATION OF STEEL PIPES

Holiday Detectors are presently being constructed by the Board for the purpose of detecting flaws in pipe linings. The tester has variable output control which adjusts the spark length to suit different applications. The change in spark output (10-22 kv) is controlled by transistorised circuit which is operated from a 250V 50Hz supply.

COMPUTORS

In the near future computer control is to be introduced into a number of treatment plants for supervision and monitoring purposes.

H A M A D S

FOR SALE Vinton MTR 30 30 watt O/P Rpx Chns 2 - 4 - 6 - 8 - 10
\$100 Peter VK6ET Ph.768928

FOR SALE BY TENDER - JULY MEETING

16 Only No. 1675 L/B Trancievers \$6.00 each
Complete
Easy converted to 6 Metres F.M.

10 only Pye Premiers \$10.00 each

1 Only MTR 20 Unit \$10.00
Single Channel

Please have your tenders in early for this equipment as it will definately be finalised at the July Meeting.
Please show the following information on your Tender
CALLSIGN *

NAME CALLSIGN

EQUIPMENT REQUIRED

SEPERATE TENDERS REQUIRED FOR EACH PIECE OF THE ABOVE EQUIPMENT

Have you given the 1977 REMEMBRANCE DAY CONTEST any thought
What about it???? Its time it came VK6 way.